Approved by Undergraduate Council 7/13/2011 Sharon Gill

General Education Course Submission Form

Date of Submission: May 5, 2010

1. Check which area(s) this course applies to.

Inquiry – Arts & Creativity	☐	Composition & Communications - II	☐
Inquiry – Humanities	☐	Quant Reasoning – Math	☐
Inquiry – Nat/Math/Phys Sci	X	Quant Reasoning – Stat	☐
Inquiry – Social Sciences	☐	Citizenship – USA	☐
Composition & Communications - I	☐	Citizenship - Global	☐

2. Provide Course and Department Information.

Department: Department of Physics and Astronomy

Course Prefix and Number: PHY231 + PHY241 Credit hours: 4+1

Course Title: PHY231-- General University Physics PHY241-- General University Physics Laboratory

Expected Number of Students per Section: 25 Course Required for Majors in your Program? Yes

Prerequisite(s) for Course? None

This request is for (check one): A New Course ☐ An Existing Course X

Departmental Contact Information

Name: Kwok-Wai Ng Email: kwng@uky.edu

Office Address: CP171 Phone: 257-1782

3. In addition to this form, the following must be submitted for consideration:

- A syllabus that conforms to the Senate Syllabi Guidelines, including listing of the Course Template Student Learning Outcomes.
- A narrative (2-3 pages max) that explains: 1) how the course will address the General Education and Course Template Learning outcomes; and 2) a description of the type(s) of course assignment(s) that could be used for Gen Ed assessment.
- If applicable, a major course change form for revision of an existing course, or a new course form for a new course.

4. Signatures

Department Chair: _____ Date: 5/13/10

Dean: Anna R. K. Bosch _____ Date: 8/5/10

College Deans: Submit all approved proposals electronically to:
Sharon Gill Sharon.Gill@uky.edu
Office of Undergraduate Education

Revised May 6, 2010

PHY231 + PHY241 "General University Physics": Learning Outcomes

1.Describe methods of inquiry that lead to scientific knowledge and distinguish scientific fact from pseudoscience.

For example, the importance of the contributions of Galileo, regarded as the father of modern science, is highlighted in this course. Prior to his innovative combination of experiment and mathematics, the natural philosophy of the time was qualitative and speculative and in many ways similar to pseudosciences like astrology and alchemy.

2. Explain fundamental principles in a branch of science.

A core goal of the course is to explain fundamental principles. For example, in this physics course a central role is played by Newton's laws which are the most fundamental laws of mechanics.

3. Apply fundamental principles to interpret and make predictions in a branch of science.

This is a highly-emphasized complementary goal to the exposition of the fundamental principles and is the most extensively tested on examinations. For example, Newton's laws are applied mathematically to solve trajectory problems such as determining where a baseball lands if thrown with a certain velocity.

4. Demonstrate an understanding of at least one scientific discovery that changed the way scientists understand the world.

Galileo's experiments suggested that, under idealized conditions, all bodies fall with the same acceleration. This discovery led to Newton's laws of motion which revolutionized natural philosophy. These laws were the first to give a mechanistic framework of how the universe works.

5. Give examples of how science interacts with society.

Our technological society would not be possible without physics. The mechanics taught in PHY 231 serves as the ultimate foundation of our technological-scientific world view.

6. Conduct a hands-on project using scientific methods to include design, data collection, analysis, summary of the results, conclusions, alternative approaches, and future studies.

This is the essence of the laboratory component of the PHY 231/PHY 241 pairing. During each of the five laboratories conducted each semester students will explore, compare and contrast different methodologies for gathering data on a particular phenomena such as the acceleration due to gravity. They will look at both automated and manual collection of the data required, analyzed the methodology and equipment used to determine the uncertainty in the initial measured parameters and then propagate these uncertainties to ascertain the precision and accuracy of a particular experimental method. They will conduct a detailed comparative analysis of the experimental methods applied and report on their findings, drawing relative conclusions and if needed applying alternate approaches and secondary analyses to obtain results more consistent with their initial hypotheses.

7. Recognize when information is needed and demonstrate the ability to find, evaluate and use effectively sources of scientific information.

Throughout the semester the students will find that information required to conduct the experiment and analyze the results will not be provided in the confines of the laboratory, in these cases the students will need to go to external sources such as the science library and various Internet sites to research and record critical informational elements needed to complete the experiment.

Explanation:

PHY241 is the laboratory component of the PHY231 General University Physics. These two courses have to be paired together for GenEd compliance.

PHY241
Gen Ed
1-PS

University Senate Syllabi Guidelines

General Course Information

- [x] Full and accurate title of the course.
- [x] Departmental and college prefix.
- [x] Course prefix, number and section number.
- [x] Scheduled meeting day(s), time and place.

Instructor Contact Information (if specific details are unknown, "TBA" is acceptable for one or more fields)

- [ ] Instructor name.
- [ ] Contact information for teaching/graduate assistant, etc.
- [ ] Preferred method for reaching instructor.
- [ ] Office phone number.
- [ ] Office address.
- [ ] UK email address.
- [ ] Times of regularly scheduled office hours and if prior appointment is required.

Course Description

- [x] Reasonably detailed overview of the course.
- [x] Student learning outcomes.
- [x] Course goals/objectives.
- [x] Required materials (textbook, lab materials, etc.).
- [x] Outline of the content, which must conform to the Bulletin description.
- [x] Summary description of the components that contribute to the determination of course grade.
- [x] Tentative course schedule that clarifies topics, specifies assignment due dates, examination date(s).
- [x] Final examination information: date, time, duration and location.
- [x] For 100-, 200-, 300-, 400-, 400G- and 500-level courses, numerical grading scale and relationship to letter grades for *undergraduate* students.
- [ ] N/A For 400G-, 500-, 600- and 700-level courses, numerical grading scale and relationship to letter grades for *graduate* students. (Graduate students cannot receive a "D" grade.)
- [x] Relative value given to each activity in the calculation of course grades (Midterm=30%; Term Project=20%, etc.).
- [ ] Note that undergraduate students will be provided with a Midterm Evaluation (by the midterm date) of course performance based on criteria in syllabus.
- [ ] Policy on academic accommodations due to disability. Standard language is below:

  If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.

Course Policies

- [x] Attendance.
- [x] Excused absences.
- [x] Make-up opportunities.
- [x] Verification of absences.
- [x] Submission of assignments.
- [ ] Academic integrity, cheating & plagiarism.
- [x] Classroom behavior, decorum and civility.
- [ ] N/A Professional preparations.
- [x] Group work & student collaboration.

UNIVERSITY OF KENTUCKY
DEPARTMENT OF PHYSICS AND ASTRONOMY
PHYSICS 241 LABORATORY
COURSE SYLLABUS
Spring 2010

1. PURPOSE: This document provides detailed information regarding the Physics 241 laboratory course. This laboratory will provide an experimental environment where student research teams will be given the opportunity to explore some of the theory, concepts and physical phenomena covered in Physics 231 lecture and recitation, in a hands on, small group environment. And the majority of experiments students will learn to experimentally determine physical quantities associated with a given phenomena. Using the equipment provided they will use parallel methodologies to determine theoretically comparable results. Then using several analysis techniques, they will formally compare the results and determine if they are significantly different or not. If the primary analysis determines that the values are significantly different than the students will perform a secondary analysis and comparison, looking for omitted systematic error and possible over estimation of the precision in their original measurements. Using these corrections the secondary analysis should then bring the compared values closer to coincidence.

2. OBJECTIVES:
   a. Develop an understanding of selected physical phenomena in a laboratory setting.
   b. Develop standard techniques for comparative analysis of experimentally derived results.
   c. Develop an understanding of precision and accuracy in experimental work and how uncertainties in measurement effect the uncertainties in experimental results.(error propagation)
   d. Enhance students' capabilities in creating and analyzing graphical information.
   e. Exercise and enhance technical writing skills.
   f. Exercise and enhance leadership and management skills using a small research team model.

3. SCOPE:
   a. The selected lab exercises, in general, follow a path similar to that used in Physics 231 Lecture.
   b. Subjects may be introduced in lab that are not covered in Physics 231. Students should always be prepared by carefully reviewing the subject matter before entering the lab and take detailed notes during the instructors introduction to the laboratory.

4. MISSION: The PHY 241 Instructional Team will ensure that every student is given the opportunity to master the course objectives and achieve their full potential while seeking to improve the course pedagogy to better meet the needs of all students, both present and future.

5. EXECUTION:
   a. The Instructional Team is composed of the following members, each with specific duties and responsibilities with respect to the conduct of the laboratory.
      i. Instructional Lab Specialist/Academic Coordinator
         (1) Provide long term vision for instructional lab program.
         (2) Provide and coordinate resources, including budget, space, personnel and equipment.
         (3) Train and supervise teaching assistants.
         (4) Supervise and coordinate weekly teaching meetings/seminars.
         (5) Supervise lab grading practices.
         (6) Mediate student to TA and student to student disputes.
         (7) Develop and publish lab manuals and materials.
         (8) Develop new experiments and test new equipment.
      ii. Senior Lab Teaching Assistant:
         (1) Setup and test all lab equipment for each lab.
         (2) Check and reconfigure lab set ups daily.
         (3) Coordinate equipment needs for make up labs.
         (4) Provide weekly summaries of equipment use and trouble shooting.
      iii. Lab Teaching Assistants:
         (1) Provide a brief introduction to each lab.
         (2) Serve as an advisor to the student research teams in each section.
         (3) Emphasize connectivity with lecture topics.
         (4) Grade all written work IAW weekly lab seminars/ meetings and this Syllabus.
         (5) Assist in the development of new labs.
         (6) Provide input to the lecturers regarding lab questions on exams.
         (7) Provide feedback on course development issues.
         (8) Mediate intra team disputes.
         (9) Maintain a daily journal of lab activities. (experimental note book)
      iv. Students:
         (1) Prepare pre labs and quizzes individually.
         (2) Be familiar with your assigned role and associated duties. (Principle Investigator, Researcher, and Skeptic.) These roles will rotate each week.
         (3) Fully participate in each lab, draft report and the final report development process.
         (4) **The responsibility for learning is yours alone.**

(5) Use the combined power of your research group efficiently.

b. Other means of assistance
   i. TA , lecturer, office hours and appointments
   ii. Email and phone conversations.
   iii. Physics Resource Room
   iv. Private tutors,(ask at the main office (CP 177). Plan ahead; they book early.)

6. ADMINISTRATION AND LOGISTICS:
   a. Lab Manual, "Physics 241 Laboratory Manual for General Physics, Spring 2010", Ellis. Available at Johnny Print. 22 Jan 2010. Each student must have their own copy.
   b. TI , 84, or 83+ Calculator is required , TI 85/86 or 92 will work with TI Sonic Ranger but not all experiments under development. Each team must have at least two of the required series calculators. The **TI 84 + Silver** is the best all around choice, and is **highly recommended**. Each student must have their own calculator.
   c. Lab computers: each lab is equipped with a minimum of 10 computers. computers. (Your TA will issue a user id and password to be used in the lab.)
      i. All computers are networked and have MS Office Suite 2007, Logger pro, Fundamental Science Skills and TI Connect installed.
      ii. Programs and data can be transferred to and from your TI graphing calculator, using the TI Connect software and Graph Link cable provided.
      iii. When not in use by you, these computers are analyzing data collected by several radio telescopes as part of a distributed processing program (SETI @home).
      iv. Modifying these systems in any way is forbidden and could result in the loss of credit for the current lab and for your entire lab entire group.
      v. **You are encouraged to begin writing your report, when appropriate, during your lab time and then emailing your work to another location for further action.**
      vi. Leave the lab computers on and facing the lab entrance when you depart from the lab.
      vii. Use caution when moving the computer around on the bench top and do not leave them under a water faucet.
      viii. Your **RF transmitter** is required in lab for your quizzes and other assessments. If you forget your transmitter you will fill out a paper form to answer the quiz. For paper submissions of 10 point quizzes, 2 points will be awarded for a correct answer and 1 point for an incorrect answer. Quizzes are each worth a total 10 points, these points may be given all at one time or divided up into smaller quizzes administered during the experimental session or the draft session.
   d. Lab Schedule. Notes: Five labs will be performed over the semester. The last lab

is a lab final and is worth 200 points. The lab final is viewed as the culmination of your learning experience. *Doing substantially better on the final can raise your final grade by one letter grade* The labs will follow the general flow of the lecture when possible.

Lab Meeting	Dates (Week Beginning)	Title/ Notes
Introduction	25 Jan	Orientation Study Syllabus
1a	1 Feb	Measuring g
1b	8 Feb	Draft Due
2a	15 Feb	Projectile motion
2b	22 Feb	Draft Due
3a	1 Mar	Conservation of Linear Momentum
3b	8 Mar	Draft Due
4a	22 Mar	Spiral Spring and Hooke's law
4b	29 Mar	Draft Due
5a Part 1	5 Apr	Lab Final Rotational Dynamics
5a Part 2	12 Apr	Lab Final Rotational Dynamics
5b	19 Apr	Draft Due
Final Labs Due	23 Apr	Monday Labs Final Due
Final Labs Due	24 Apr	Tuesday Labs Final Due
Final Labs Due	25 Apr	Wednesday Labs Final Due
Final Labs Due	26 Apr	Thursday Labs Final Due
Final Labs Due	26 Apr	Friday Labs Final Due

e. Research Team Roles:

i. General: Consider your lab group as a typical research team assigned to perform an experiment and submit the results in a paper to an upcoming undergraduate symposium. To accomplish this task, each person has a

specific role to play as well as a general responsibility to ensure that the paper meets the high standards expected and reflects the lab groups effort.

ii. Principle Investigator
   (1) Responsible for everything the team does or fails to do.
   (2) Coordinates team activities in lab and during the out of lab report completion process.
   (3) Ensures that all team members contribute fairly.
   (4) The PI develops and writes the "Results and Conclusions" paragraph of the lab report
   (5) Responsible for the integration of the report in both style and content.
   (6) Answers question asked on the lab manual, incorporates them into the report where they best fit.

iii. Researcher
   (1) Focuses on the in-class execution of the experiment.
   (2) Team's expert on the systems used and methods of data collection and recording.
   (3) Develops and writes the " Introduction" and "Data and Calculations" paragraphs and the raw data appendix.

iv. Skeptic
   (1) Analyses uncertainties associated with measurements and procedures
   (2) Propagates uncertainties through the experiment and correlates the relative contribution of each to the uncertainty in the results.
   (3) Develops the "Analysis and Discussion" paragraph and ensures consistency of thought and flow with the key ideas into the "Results and Conclusions" paragraph.

f. Grading Policy and General Requirements:

i. General
   (1) Lab exercises will have a total possible score of 100 points. The five lab grades plus the sum of the five draft scores will be averaged and then incorporated into the course grading scheme. The point break down by section is as follows:
      (a) Introduction 10
      (b) Data and Calculations 20
      (c) Analysis and Discussion 30
      (d) Results and Conclusions 40
      (e) The TA will grade the entire report first and obtain a report total.
      (f) This score represents the lab team's combined effort.
   (2) Each team member's contribution will then be assessed as

follows:

(a) Principle Investigator:
  (i) Possible points: 60(40 "Results and Conclusions" paragraph + 10 Quiz and Prelab + 10 PI points)
  (ii) The points earned by the PI will be divided by the points possible (60) to produce a decimal. This decimal will be multipled by 100 and averaged with the overall lab report grade to give the PI's individual grade.
  (iii) Example: If the teams overall lab report grade was a 95 and the PI's "Results and Conclusions" paragraph was a 34, the PI's prelab and quiz score was a 5 and the PI earned 8 out of 10 PI points, then 47/60 = 0.78. So, 93 plus 78 divided by 2 gives the PI an exercise score of 85.5.

(b) Skeptic:
  (i) Possible points: 40(30 "Analysis and Discussion" paragraph + 10 Quiz)
  (ii) Example: If the teams report grade was a 95 and the Skeptic's "Analysis and Discussion"paragraph was a 29, the prelab and quiz score was a 10 then 39/40 = 0.975. So, 93 plus 97.5 divided by 2 gives the Skeptic 95.

(c) Researcher
  (i) Possible points:40 (10 "Introduction" + 20 "Data and Calculations" +10 Quiz)
  (ii) Example: If the team's report earned a 95 and the Researcher's "Introduction" earns 10 points and the "Data and Calculations" earns 20 giving a paragraph score of 30, the prelab and quiz score was a 10 then 40/40 = 1. So, 93 plus 100 divided by 2 gives the researcher a 96.5.

(d) The Draft will be submitted 24 hours before the draft review session and will be graded as follows:
  (i) 20 Points: a reasonably complete report based on the expectations presented by your TA.
  (ii) 15 Points: one major item not considered.
  (iii) 10 Points: two major items not considered
  (iv) 5 Points: More then two major items not considered.
  (v) 1 Points: Group is present but draft reflects minimal effort.
  (vi) 0 Points: absent or none submitted.
  (vii) Major items include sample calculations, error propagation, graphs, number lines and anything

else deemed major by the teaching team.

(e) Your TA will grade your draft and then verbally offer constructive criticism to your group. (Take careful notes.) During the draft session , Tas are only responsible for identifying major problems in a draft, primarily structure. *Tas are not expected to find all mistakes in a draft. It is the students' responsibility to point out specific problems and areas of difficulty as well as ask relevant questions.*

(f) The five draft scores will be added together and will represent a sixth, 100 point, graded event to be averaged with your 5 lab grades.

(g) Drafts are expected to be as complete as possible so that the TA can give a thorough evaluation of the groups work. Sections that cannot be included in the draft because of time constraints in the first lab period should, as a minimum, be given a place holder sentence in the report.

(3) If Bonus exercises are offered, they will be announced by the Lab instructor and approved in our weekly seminar.

ii. Quizzes and Pre Labs
   (1) These are individual requirements.
   (2) Turned in or administered at the beginning of the lab.
   (3) Normally weighted at 10 points.

iii. Each lab report and Draft **must be entirely word processed**. Each instance of non-word processed entries will lose 1 point. The PI will also lose 2 points.

iv. Letter Grades will be assigned as follows:
   - 90% - 100% A
   - 80% - 89% B
   - 70% - 79% C
   - 60% - 69% D
   - Below 60% E

v. Each Lab report must be submitted in both paper copy and electronically (minus the raw data). The electronic copy must be in MS office 2007 format. A standard format for the file name will be issued by your TA. A grade of zero will be give in the absence of this electronic report.

(1) **Introduction** (10 Points)

(a) Administrative information

(i) The first page of the lab report must be the standard cover sheet which is located on the course web pageand includes: title, section, TA's name, signature of each team member and position held. *Signing the lab indicates you have reviewed the final product and concur with the content, logic*

and conclusions of the report. The absence of a signature will result in a zero. The team must meet and agree on the report prior to the turn in. Not signing under protest must be reported to the TA at the beginning of the lab period. Late penalties may be applied to the entire team until the disagreement is rectified.

(b) Experimental Log
  (i) Step by step record of procedure followed, Not a recap of the manual: what the team actually did.
  (ii) What equipment was used (serial numbers or Lab ID numbers are recorded).
  (iii) Include references and sources in addition to the lab manual.
  (iv) Records of post lab meetings: who attended, What was accomplished, when was it held. A minimum of three such meetings are recommended. One shortly after the lab period to organize the team, a second at the midpoint of the time allotted to exchange draft paragraphs and initial calculations and a final meeting 24 hours before the turn in deadline to approve the final report or make final corrections and sign.

(2) **Data and Calculation** (20 Points)
  (a) Raw data (recorded in ink and initialed by your TA)attached as Appendix 1. The absence of the raw data at turn in time will start the late points calculation and if not corrected will result in an exercise grade of zero.
  (b) Word processed data tables injected logically into the flow of the report. (They should be introduced by at least on sentence).
  (c) Sample Calculations must be provided for each major mathematical step and must be generated using the word processor's equation editor, not hand written.

(3) **Discussion and Analysis** (30 Points)
  (a) Graphs complete and annotated
    (i) Use Excel or Logger Pro.
    (ii) Inserted into flow of the report.
    (iii) Show data points with error bars.
    (iv) Clearly show where slopes and other analytical points are extracted.
  (b) Propagation of uncertainties and assessment of their impact on the experimental result. See web appendix for more detail.
  (c) Narrative of the team's interpretation of the analysis.

(i) Answers to lab manual questions should be integrated into the narrative and followed by (Ans. Q1) *These are the PI responsibility and may be inserted anywhere in the report that the team feels is logical.*

(ii) Calc % diff or % error where appropriate.

(iii) Identify and discuss Random and Systematic Error / accuracy and precision.

(iv) Identify and discuss each source of error considered and the methodology used to assess it's relative importance to the result, show calculations.

(v) Discuss propagation of error, show calculations and how data was obtained (graphically, statistically or through numerical propagation.

(vi) Rank and order all sources of error from major to minor, *showing calculations to support your findings*

(vii) Sources of error and their relative contribution must track with the "Results and Conclusions" paragraph.

(4) **Results and Conclusions** (40 Points)

(a) Begin with a clear, concise statement of <u>each</u> experimental result and associated uncertainties, percent differences should be included for comparative results. A number line showing the values being compared and their propagated uncertainties this graphically clarifies the relative significance of the percent difference

(i) Conclusions drawn by the team regarding the significance of the initial uncertainties, referencing other parts of the report, addressing precision (Random Error) and Accuracy (Systematic Error).

(ii) When comparing experimental results, use a number line to demonstrate whether the difference is significant or not.

(iii) For each result, make certain your words agree with the graphics.

(iv) Since most experiments will have several comparative results it is suggested the you group the statement of result, the number line and the conclusions for each comparative result together for clarity.

(v) If the group finds two results to be significantly different then they must return to the analysis and discussion paragraph and perform a secondary analysis. This analysis should first look for missed

systematic error and overestimation of precision. These corrections should then be run through the calculations and a corrected number line included in the results and conclusions at a minimum this should indicate a movement of the results towards coincidence.

(5) All reports will be turned in at the beginning of the next lab.
   (a) 5 points/ 30 minute period will be deducted for reports turned in after the start of the lab period. For a maximum of 20 points by the end of the 2 hours These points are subtracted from the overall lab report score and effect the entire team.
   (b) An additional 10 points will be deducted for each day the report is late.

(6) PI's 10 Points
   (i) Awarded for observed positive leadership. These are not bonus points. They are awarded at the TA's discretion. Some examples include: (1 point each)
      1) Was the Team prepared for Lab?
      2) Were team roles assigned and exercised?
      3) Was each member of the team gainfully employed during the Lab?.
      4) Did the team follow sound / safe procedures? (equipment damage, tinkering with computers.)
      5) Did the PI take charge and accept responsibility?
      6) Was the report complete and thorough?
      7) Did the report reflect contributions by all members of the team?
      8) Was the report written in clear, concise technical style?
      9) Did the report and other activities reflect corrections to previously noted shortcomings?
      10) Did the results and conclusions reflect sound scientific thought and reasoning: IAW basic university science requirements?

(7) Absence from Lab
   (i) Attendance in Lab is mandatory
   (ii) An un excused absence during the experiment or the draft session will result in a lab grade of 0.
   (iii) Arriving late or leaving early (before the TA

releases the team) without a valid, verifiable excuse, will result in a deduction of 5 points for each 10 minute period of absence to be deducted from the individuals final score.

(iv) Excused absences must satisfy the University Senate rules and be valid (specifically cover the time period missed) and verifiable (e.g., including a telephone number). If possible, documentation should be presented prior to the absence so that arrangement can be made for a makeup while the lab is active.

(v) In the case of emergencies appropriate information must be submitted within 48 hours of the absence.

(vi) The absence of one team member does not necessarily adjust the turn in time for a lab report.

g. **Course Evaluations.** Course Evaluations are an important (and mandatory!) component of our department's instructional program. An on-line course evaluation system was developed to allow each student ample time to evaluate each component of the course and the instructor, thus providing the department with meaningful, numerical scores and detailed commentary while minimizing loss of instructional time in the classroom. The evaluation window for Spring 2010 will open on *12 Apr and close on 28 Apr*. To access the system during this time, simply go to the Department of Physics web page, click on the link for course evaluations then follow the instructions. You will need to use your student ID# to log into the system, and this will allow us to monitor who has filled out evaluations. However, when you log-in, you will be issued a randomly generated evaluation ID that will keep all your comments and scores anonymous. 5 course bonus points will be awarded to each student completing the evaluations.

7. COMMUNICATION: The primary means of communication will be Blackboard backed up by the course Website.

a. Multiple means of communication are available to each student, ensuring availability of members of the instructional team.These include:

i. Email
ii. Office Phone
iii. Home Phone
iv. Written message (Main office room 177)
v. TA's Main Office mail box, Lab reports are not to be turned into this location under any circumstances.

b. See Blackboard or the Department of Physics web site for other contact information.

8. SAFETY:

a. Your instructor will highlight safety consideration for each laboratory exercise.
b. Each lab room is equipped with several safety and first aid devices, please note their location during your first lab meeting.
    i. Emergency exit sign. Familiarize yourself with the most expeditious exit route.
    ii. Safety glasses when required
    iii. Gas shut off valve
    iv. Eye wash and shower unit
    v. First Aid kit
    vi. Emergency 911 cell phone.
c. No food or drinks are permitted in the lab.
d. Clothing and backpacks should be stored under the benches.
e. Safety, as always, is everyone's responsibility.

Respectfully

S.L.Ellis, 20 Jan 2010