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OFFICE OF THE SENATE COUNCIL

APPLICATION FOR NEW COURSE

1. Submitted by College of Arts & Sciences Date 22 March 2006

   Department/Division offering course Physics & Astronomy

2. Proposed designation and Bulletin description of this course

   a. Prefix and Number PHY 435 b. Title* Intermediate Physics Laboratory

   *NOTE: If the title is longer than 24 characters (including spaces), write
   A sensible title (not exceeding 24 characters) for use on transcripts Intermed Physics Lab

   c. Lecture/Discussion hours per week 0 d. Laboratory hours per week 4

   e. Studio hours per week 0 f. Credits 3

   g. Course description

   An intermeidate-level laboratory course emphasizing quantum phenomena in atomic, solid state and nuclear systems. Laboratory techniques include optical spectroscopy, gamma-ray and particle detection, atomic and nuclear collisions, and interferometry. This course satisfies the Graduation Writing Requirement.

   h. Prerequisites (if any)

   PHY 335, PHY 361

   i. May be repeated to a maximum of _____ (if applicable)

4. To be cross-listed as

   _____ (Prefix and Number) _____ (Signature, Chairman, cross-listing department)

5. Effective Date Spring 2007 (semester and year)

6. Course to be offered ☐ Fall ☒ Spring ☐ Summer

7. Will the course be offered each year? ☒ Yes ☐ No
   (Explain if not annually)

8. Why is this course needed?

   Presently, PHY 535 is a repeatable laboratory course in which the instructor tailors the experimental project content to each student's degree requirements. Students in the BS program are required to complete several of the more challenging project, while BA students and Physics minors are not. This has led to confusion for both the students and the instructor. We propose to instead offer two lab courses: a new Intermediate Physics lab (PHY 435) and the more advanced PHY 535 lab. PHY 535 will primarily contain the more difficult projects, and PHY 435 the less demanding ones. Neither course will be repeatable. Students can them select the course or courses which meet their degree requirements: BS students MUST takte PHY 535 and may also take PHY 435 (though not as a prerequisite); non-BS students may select among PHY 435, PHY 535 and other lab courses to satisfy their degree requirements. Both courses will be taught at the same days and times, in the same laboratory, and by the same insttuctor. Enrollments in both PHY 435 and PHY 535 will be combined for accounting purposes, as will the instructor's teaching credit, which will total only 3 hours.

   Students enrolled in PHY 435 will complete 7 projects and submit a final report on each. Their daily work in the lab, the lab

notebook they keep, and the final report are all evaluated to determine the project grade. We propose to use PHY 435 to satisfy the Graduation Writing Requirement of our students. ALL students in PHY 435, those who require GWR credit and those whodo not, will be held to the same high standards of writing. Written reports will be routinely returned to the students for corrections and improvements. In addition to the time spent in class, the writing component of this course represents a significant workload for the students. Accordingly, we propose to assign a course credit of 3 hours.

9. a. By whom will the course be taught? Experimental physics faculty

b. Are facilities for teaching the course now available? ☒ Yes ☐ No
If not, what plans have been made for providing them?

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10. What enrollment may be reasonably anticipated? 4 students per year

11. Will this course serve students in the Department primarily? ☒ Yes ☐ No

Will it be of service to a significant number of students outside the Department? ☐ Yes ☒ No
If so, explain.

Will the course serve as a University Studies Program course? ☐ Yes ☒ No

If yes, under what Area? _____

12. Check the category most applicable to this course

☒ traditional; offered in corresponding departments elsewhere;

☐ relatively new, now being widely established

☐ not yet to be found in many (or any) other universities

13. Is this course applicable to the requirements for at least one degree or certificate at the University of Kentucky? ☒ Yes ☐ No

14. Is this course part of a proposed new program: ☐ Yes ☒ No
If yes, which?

15. Will adding this course change the degree requirements in one or more programs?* ☐ Yes ☒ No
If yes, explain the change(s) below

16. Attach a list of the major teaching objectives of the proposed course and outline and/or reference list to be used.

17. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted. ☐ Check here if 100-200.

18. If the course is 400G or 500 level, include syllabi or course statement showing differentiation for undergraduate and graduate students in assignments, grading criteria, and grading scales. ☒ Check here if 400G-500.

19. Within the Department, who should be contacted for further information about the proposed course?

Name Michael A. Kovash, DUS (dus@pa.uky.edu) Phone Extension 257-1150

*NOTE: Approval of this course will constitute approval of the program change unless other program modifications are proposed.

APPLICATION FOR NEW COURSE

Signatures of Approval:

Department Chair	3/28/06 Date
Dean of the College	4/4/06 Date
	3/29/06 Date of Notice to the Faculty
*Undergraduate Council	11-7-06 Date
*University Studies	Date
*Graduate Council	Date
*Academic Council for the Medical Center	Date
*Senate Council (Chair)	Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL

Rev 3/04

Abbreviated Syllabus:
PHYSICS 435W
INTERMEDIATE PHYSICS LAB
SPRING 2007

Instructor: Prof. Michael A. Kovash
Office: CP-171, 257-1150
Office Hours: Wednesday, 1-2
electronic mail: kovash@pa.uky.edu

GOALS

Physics 535 is an intermediate-level laboratory course in which a variety of projects spanning the fields of atomic, solid state and nuclear physics will be investigated. In this largely self-directed course, students will learn laboratory skills and also gain valuable practice using statistical methods of data analysis.

The specific goals of PHY 435 include:

- To gain first-hand experience working in a laboratory setting by completing several 'classic' physics experiments, many of which were instrumental in defining our modern, quantum-mechanical picture of atomic and nuclear systems,
- To learn numerical methods for evaluating the uncertainties associated with laboratory measurements, and for determining optimized parametric representations of measured data, and,
- To learn effective methods for recording and reporting the results of laboratory measurements.

EXPERIMENTAL PROJECTS

Physics 435 contains experimental projects grouped into three broad categories: Atomic Physics, Nuclear Physics, and Optics and Spectroscopy. Every student will be assigned projects from each of these categories. Note that there is some overlap between the projects used in PHY 535 and those listed below for PHY 435. Any student who previously completed a particular project in PHY 535 will not be assigned the same project in PHY 435.

The experiments which are available this semester are:

Atomic Physics

A1 Millikan Oil Drop: e
A2 Electron Magnetic Deflection: e/m
A3 Photoelectric Effect: h/e
A4 Franck-Hertz: Hg Excited State

Nuclear Physics

N1 Gamma-Ray Absorption: Attenuation Coefficients, Counting Statistics
N2 Gamma-Ray Spectroscopy: Energy Calibration, Resolution, Efficiency
N3 Alpha-Particle Spectroscopy: Bragg Curve, Energy Straggling
N4 Rutherford Scattering: Angular Distribution

Spectroscopy and Optics

SO2 Two-Slit Interference: Optical Waves and Photons
SO3 Microwave Optics: Refraction, Standing Waves, Interferometry
SO5 Polarization and Optical Activity
SO6 The Michelson Interferometer
SO7 Optical Dispersion: Index of Refraction

All experiments are assigned a total of 4 two-hour lab periods, ie they span two weeks of classes. Graduate students enrolled in PHY 435 will complete the same number of laboratory projects as undergraduate students. However, the instructor will suggest additional work for graduate students to do in each of their projects. This may take the form of requiring additional measurements or more sophisticated data analysis, or both.

NOTEBOOKS

Everyone is required to purchase a *bound* laboratory notebook from the instructor for use throughout the term. The cost is only $6. The book contains *gridded paper* on which graphs can be easily constructed. No carbon paper is needed. This book will become a record of your preparations, methodologies, observations, graphs, and all other lab work. Throughout the semester we will emphasize the appropriate construction of the notebook, and how it is used to maintain an effective real-time record of your work in the lab.

Students will submit their lab notebook for grading after each experiment. A new experiment can be started only after the graded lab notebook has been returned, which will be within 24 hours of its submission.

REPORTS

Because PHY 435 satisfies the Graduation Writing Requirement (GWR), we will emphasize effective methods for writing concise, coherent, and informative stand-alone lab reports. *All* undergraduate students enrolled in PHY 435, not just those seeking to satisfy the GWR, will be expected to prepare their reports to the same high standards. Each report must be typewritten and contain at least 4 double-spaced pages of text. All figures must be carefully designed and properly labeled. The overall structure of the report must be carefully organized and contain all of the essential ingredients of a technical report. In addition, the sentences and paragraphs must be clearly constructed and free of grammatical and spelling errors. The first drafts of your reports will be graded and returned to you for correction. Following this iteration procedure, a final grade will be assigned to the report.

Excerpted from www.uky.edu/UGS/WritingInitiative/wchecklist.htm:

Writing-Intensive Course Requirements

Any course approved for the Graduation Writing Requirement will involve the following learning outcomes, writing requirements, and grading policies.

Learning Outcomes

- *Write a paper that is essentially free of mechanical errors (grammar, punctuation, spelling, and syntax) and awkwardness, using a style that is appropriate to the purpose and audience.*
- *Demonstrate an ability to discover, evaluate, and clearly present evidence in support of an argument in the subject area and utilize documentation that conforms to the formats and the citation conventions of the subject area.*
- *Be aware that composing a successful text frequently takes multiple drafts, with varying degrees of focus on generating, revising, editing, and proofreading.*

Writing Requirements

- *Students will be required to write a minimum of 15 pages of formal writing. At least 10 of the 15 pages must be single-authored assignments. No assignments requiring fewer than 4 pages may be included in the 15-page minimum.*
- *All of these 15 pages must go through a draft, review, and revise process.*

Grading Policies

- *To pass the course, students must submit all formal writing assignments (in draft and final form) and earn a grade of C or higher on each. Assignments other than the formal writing assignments enter into the final grade determination only if the student has achieved grades of C or higher on the formal writing assignments.*
- *Any major assignment that receives a D or below must be revised to reflect competency and resubmitted. Instructors may limit the number of revision attempts.*
- *In no case may a student whose writing fails to reach the level of C (competent) receive a passing grade in a course that satisfies the University Writing Requirement.*

  In summary: To pass the course and fulfill the upper tier of the GWR, students must submit all formal writing assignments and earn a grade of C or better on each assignment. Any major assignment that receives a D or below must be revised to reflect competency and resubmitted. Students may resubmit such assignments 2 times. If they fail to achieve a C grade on the final version of any major writing assignment, the student will receive a failing grade for the course. Note that assignments or requirements other than the formal writing become a factor in the final determination of the course grade only if the student has achieved a grade of C or higher on all formal writing assignments.

Assessment

- *Students will submit two copies of their final paper of the semester. One copy will be graded by the instructor; the second copy will be used for SACS assessment and should be a clean copy, with only the student's social security number listed at the top of the page.*

Student Eligibility

- *This is a writing-intensive (W) course approved to fulfill the upper tier of the graduation writing requirement (GWR). To receive W credit for this course, students must have successfully completed the first-year writing requirement (ENG 104 or its equivalent) and have completed at least 30 hours of coursework.*

Plagiarism

Part II of Student Rights and Responsibilities (available online at http://www.uky.edu/StudentAffairs/Code/part2.html) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research,

or self-expression. In cases where students feel unsure about a question of plagiarism involving their work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work, whether it be published article, chapter of a book, a paper from a friend or some file, or whatever. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be. Students may discuss assignments among themselves or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone.

When a student's assignment involves research in outside sources or information, the student must carefully acknowledge exactly what, where and how he/she has employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain. (Section 6.3.1).

The minimum penalty for an academic offense, such as cheating or plagiarism, is an E in the course (Section 6.4.1).

GRADING

A daily classwork grade of 0-10 points will be assigned by the instructor for work in each regular (Tue. & Thur.) lab period. Students who arrive on time and well prepared for class, and who are diligent, careful, accurate and effective in their lab work will receive a daily score of 10; students whose work in the lab is somewhat less than ideal will receive a score of 8; students who exhibit serious deficiencies in their lab work will receive a score of 6; and students with an unexcused absence will receive a daily score of 0. *Do not for a minute think that you will be penalized in your daily score for asking questions in class. Indeed, asking insightful questions can actually help you earn a 10-point score.* And don't worry if you have no questions; the instructor will usually have plenty for you.

There will be no mid-term or final exam in this course; each student's accumulated score on their lab work will be the basis for their final grade assignment. The final Project Grade for each of the 7 experiments will be the weighted average of the score for the lab notebook (1/4), the lab report (1/2), and a classwork grade (1/4). Students with unexcused absences may be explicitly penalized when final grades are assigned. Also note that an 'I' grade in this course will only be given in cases where a student is unable to complete the lab work because of illness or similarly debilitating personal

circumstance. Other students will receive scores of zero for all uncompleted work, and a final course grade will be assigned.

ARTS AND SCIENCES
EDUCATIONAL POLICY COMMITTEE
INVESTIGATOR REPORT

INVESTIGATING AREA: **Nat. & Math. Sci.** COURSE, MAJOR, DEGREE or PROGRAM: **PHY 435, PHY 535 .**

DATE FOR EPC REVIEW: **4/14/06** CATEGORY: ***NEW***, CHANGE, DROP

INSTRUCTIONS: This completed form will accompany the course application to the Graduate/Undergraduate Council(s) in order to avoid needless repetition of investigation. The following questions are included as an outline only. Be as specific and as brief as possible. If the investigation was routine, please indicate this. The term "course" is used to indicate one course, a series of courses or a program, whichever is in order. Return the form to **Leonidas Bachas, Associate Dean, 275 Patterson Office Tower** for forwarding to the Council(s). ATTACH SUPPLEMENT IF NEEDED.

1. List any modifications made in the course proposal as submitted originally and why. **None were made.**

2. If no modifications were made, review considerations that arose during the investigation and the resolutions. **It was initially unclear how instructor time and effort would be computed since there is to be one instructor in two courses that meet simultaneously in different but adjacent rooms. Both the Physics department and the Dean of A&S agreed that there is a mechanism for determining time and effort. The dean's comment is below:**

   "This is just fine. John Pica will follow up with the department if there are any specific monitoring issues that need to be observed regarding how everything is counted."
   Steven L. Hoch
   Dean
   College of Arts and Sciences

3. List contacts with program units on the proposal and the considerations discussed therein. **Drs Bhavsar and Kovash, Physics, considered the above concern about instructor time and effort and agreed with the Dean's assessment that no problem exists.**

4. Additional information as needed. **None**

5. A&S **Area Investigator** Recommendation:

   APPROVE, APPROVE WITH RESERVATION, OR DISAPPROVE

6. A&S **Education Policy Committee** Recommendation:

   APPROVE, APPROVE WITH RESERVATION, OR DISAPPROVE

7. _____ Date: **4/20/06**
   A&S Council Investigator, **Phil Bonner**

File: \InvestigatorRpt