

Uwisc App 9/16/16 16-32

LSC App 9/1/16
Senate App 10/4/16

REQUEST FOR APPROVAL TO USE W-DESIGNATION

LSC # _____
Action _____

COVER SHEET: Request for Approval to Use W-Designation

TYPE I. PROFESSOR COMMITMENT

- Professor John L. Bradshaw Phone 357-7731
- Writing Workshop? (If not at IUP, where? when?) _____
- Proposal for one W-course (see instructions below)
- Agree to forward syllabi for subsequently offered W-courses?

TYPE II. DEPARTMENT COURSE

- Department Contact Person Dr. John L. Bradshaw Phone 357-7731
- Course Number/Title PHYS 350 - Intermediate Experimental Physics I
- Statement concerning departmental responsibility
- Proposal for this W-course (see instructions below)

TYPE III. SPECIFIC COURSE AND SPECIFIC PROFESSOR(S)

Professor(s) _____ Phone _____
 Course Number/Title _____
 Proposal for this W-course (see instructions below)

SIGNATURES:

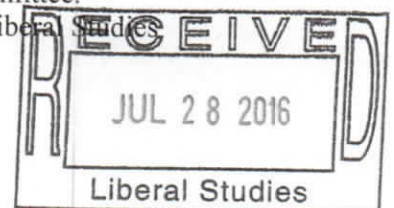
Professor(s) John L. Bradshaw
 Department Chairperson [Signature]
 College Dean [Signature]
 Director of Liberal Studies _____

COMPONENTS OF A PROPOSAL FOR A WRITING-INTENSIVE COURSE:

- I. "Writing Summary"--one or two pages explaining how writing is used in the course. First, explain any distinctive characteristics of the content or students which would help the Liberal Studies Committee understand your summary. Second, list and explain the types of writing activities; be especially careful to explain (1) what each writing activity is intended to accomplish as well as the (2) amount of writing, (3) frequency and number of assignments, and (4) whether there are opportunities for revision. If the activity is to be graded, indicate (5) evaluation standards and (6) percentage contribution to the student's final grade.
- II. Copy of the course syllabus.
- III. Two or three samples of assignment sheets, instructions, or criteria concerning writing that are given to students. Limit: 4 pages. (Single copies of longer items, if essential to the proposal, may be submitted to be passed among LSC members and returned to you.)

Please number all pages. Provide one copy to Liberal Studies Committee.

Before you submit: Have you double-checked your proposal against "The Liberal Studies Committee's Most Frequently Asked Questions"?



WRITING SUMMARY – PHYS 350 "Intermediate Experimental Physics I"

PHYS 350, Intermediate Experimental Physics I, is currently listed as a “W” course. The syllabus and nature of the writing assignments have started to become out of date. These application materials are intended to serve for a new type II W-designation status as well as a type-I W-designation application. The course is taught every fall and most students in the class are juniors or seniors; students are almost always physics or pre-engineering majors. The class size is limited to 24.

In this class students will perform and analyze the results of five intermediate-level physics experiments. Students choose five experiments from at least eight available experiments. There are five different writing assignments in this course; these assignments are summarized below.

1. **Lab Reports:** Students are expected to turn in five type-written lab reports during the semester. These reports are Writing to Communicate (WTC) exercises. Each lab report is expected to be about 7-10 pages, including figures and tables. The format of the reports is flexible. An example report in D2L has the following organizational outline: Cover Page and Outline, (1) Introduction and Purpose, (2) Background and Theory, (3) Equipment and Procedure, (4) Data, (5) Calculations and Analysis, (6) Results and Summary, (7) Conclusions.

The first lab reports are reviewed by the instructors and returned to the students for revision. The second lab reports are reviewed by peers and returned for revision. The final, revised version of these first two lab reports are then due the next week, along with the original, un-revised submission. The subsequent three lab reports have no opportunity for revision.

- What this activity is intended to accomplish: Practice writing technical and scientific reports involving background materials, procedures, data presentation, analyses, and summaries.
 - Amount of writing: 7-10 pages
 - Number of assignments: 5 experiments during the semester
 - Opportunity for revision: The first two lab reports will offer opportunity for revision. The next three lab reports will not have opportunity for revision.
 - Evaluation standards: (1) Organized outline and presentation; clear easy-to-follow transitions between sections, (2) Clear, concise language; good grammar, (3) Proper use of diagrams, pictures, graphs and tables for presentation of materials and data, (5) competent data analysis, error analysis and interpretation of results.
 - % contribution to students' grade: 10% for each of the five reports, 50% total
2. **Term Paper:** Students are expected to turn-in term paper on the date of the final exercise for the course. The subject of the term paper is flexible. These papers are Writing to Communicate (WTC) exercises. Previous term paper topics are: (1) A physics topic of the student's choice, for example “Black Hole Physics”, (2) An experimental technique, for example “Electron Paramagnetic Resonance”, (3) A physical theory, for example “What is Quantum ElectroDynamics, or QED”, and (4) An experiment in the PHYS 350 laboratory, performed with an increased scope or in greater detail or with more extensive data and error analysis.

The genre format will be that of a scientific journal article. The students are asked to use the article format from *The American Journal of Physics*. There are two intermediate due dates for the term paper. At approximately 4 weeks into the semester, the student will submit a term paper title, abstract and two references for topic approval by the instructors. Secondly, by the end of the week after Thanksgiving break, the student will turn in the term paper outline and a draft of the Introduction and Background section.

- What this activity is intended to accomplish: Experience presenting a scientific topic in the format of a professional journal article
 - Amount of writing: 10-15 pages
 - Number of assignments: one
 - Opportunity for revision: No
 - Evaluation standards:
 - (1) Basic scholarship; has the student demonstrated adequate research into the topic?
 - (2) Proper adherence to the formatting guidelines in *The American Journal of Physics*, including proper footnote format and documentation of sources
 - (3) Proper use of diagrams, pictures, graphs and tables for presentation of materials and data, as necessary
 - (4) Organized outline and presentation; clear easy-to-follow transitions between sections
 - (5) Appropriate writer voice for the reader audience
 - (6) Clear, concise language; good grammar
 - % contribution to students' grade: 20%
3. Writing lab abstracts: Before any lab group may begin an experiment, each lab partner is expected to have read the lab manuals for that experiment and the other requisite lab materials that explain the basic physics or measurement principles to be explored. Each lab partner will submit an abstract or outline of the lab in four-to-five sentences that expresses the students' understanding of the answers to the following three questions. What is the point of this experiment? That is, what basic physics equation or measurement principle is being explored? What measurements and data are necessary to quantitatively address this question? How will the experimental apparatus be used to get the data? This as a Writing to Learn (WTL) assignment.
- What this activity is intended to accomplish: This activity demonstrates to the instructors that the student has read the requisite materials and understands the materials enough to adequately address the three questions above.
 - Amount of writing: between ½ and one page
 - Number of assignments: 5 abstracts for each of five lab experiments
 - Opportunity for revision: Yes, as necessary.
 - Evaluation standards: (1) Does the student write in sentences? (2) Does the paragraph demonstrate that the student has read the background material in sufficient detail? (3) Can the student succinctly articulate the point of the experiment? (4) Does the student know what measurements and data are necessary to quantitatively address the essential point of the experiment?
 - % contribution to students' grade: 15%; 3% for each of five abstracts

4. “Chalk-Talk” Notes: Twice during the semester, every student is expected to give a 10-to-20 minute “chalk-talk”. These talks are treated by the instructors as informal presentations between friendly peers. The reading materials for the experiments in this laboratory contain “freshman-level”, and higher, equations. In the chalk talk, the student addresses: (1) What is the point of this experiment? (2) What is (are) the basic equation(s) of the physics for this experiment, and where do these equation(s) come from?

The students are allowed to give the chalk-talk from one or two pages of personal notes. That is, in answering the second question above, the student needs to first figure out for him-or-herself where the basic equations that describe the physics come from. This as a Writing to Learn (WTL) assignment.

For “freshman-level” physics equations, the student is expected to articulate the “derivation” of the equation(s). For higher-level equations, the students are still expected to articulate the origin of these equations, but the level of mathematical expression is relaxed. The instructors will review the student’s notes after the presentation, although notes are not required. If the student chooses to give their chalk talk without notes, then what the student writes on the chalk board is understood to be the product of the WTL process.

- What this activity is intended to accomplish: The student is expected to articulate the origin of the physics equations used to describe a physical phenomenon measured in an experiment. Additionally, the student is expected to address the overarching question as to how scientists go about empirically testing a theory or understand the fundamentals of a measurement technique by using the experiment as a particular example.
 - Amount of writing: 1-2 pages, handwritten
 - Number of assignments: Twice during the semester
 - Opportunity for revision: No
 - Evaluation standards: (1) Poise in presentation (2) Can the student clearly articulate the derivation or origin of the equations tested in the experiment? (3) Does the student understand what is being tested and how the data and analysis techniques will accomplish that?
 - % contribution to students’ grade: 10%; 5% for each chalk-talk
5. Lab Notebooks: Students are expected to keep lab notebooks. The lab notebooks are considered WTL exercises. The notebooks will record: (1) notes on background reading materials, (2) notes on setup and operation of the experimental apparatus, (3) experimental data that are not computer files, (4) analysis notes that are not contained in spreadsheet or graphing and analysis computer applications. The notebooks are expected to contain sufficient detail so that a peer in the laboratory could reconstruct the experiment. Additionally, the student should be able to use their notebook to answer an instructor’s questions about particular details of the experiment.
- What this activity is intended to accomplish: The students are expected to learn the value of keeping a laboratory notebook. The notebook is expected to be the default

reference (along with spreadsheet, graphing and analysis computer packages) for writing the formal laboratory report.

- Amount of writing: At least 3-4 pages per experiment
- Number of assignments: 5 experiments during the semester
- Opportunity for revision: No
- Evaluation standards: (1) Basic legibility (2) Can the student articulate to an instructor what was done in an experiment from the information in the lab notebook? (3) Can a peer reconstruct what was done in an experiment from the information in the lab notebook?
- % contribution to students' grade: 5%

Summary Chart for Writing Assignments*

A. Writing Assignments PHYS 350 – Intermediate Experimental Physics					
Assignment Title	# of Assignments	# of total pages	Graded (Yes/No)	Opportunity for Revision (Yes/No)	Written Assignment represents what % of final
Lab Reports	5	35-50	Y	First two reports, Y	50%
Term Paper	1	10-15	Y	N	20%
Abstracts	5	3-5	Y	Y	15%
“Chalk-Talk” notes	2	2-4	Y	N	10%
Laboratory Notebook	1	20-25	Y	N	5%
To	14	70 - 99	NA	NA	100%

B. Examinations (Complete only if you intend to use essay exams/short answers as part of the required number of pages of writing.)			
Exams	Approx. % of exam that is essay or short answer	Anticipated # of pages for essay or short answer, or approx. word count	Exam constitutes what % of final course
1.			
2.			
3.			
Totals			

**Total writing assignments should contain at least 5000 words (approximately 15-20 typed pages) in two or more separate assignments; written assignments should be a major part of the final grade—at least 50% or more*

Syllabus

Instructors: Dr. Muhammad Z Numan (mznuman@iup.edu),
Dr. John Bradshaw (bradshaw@iup.edu)

I Catalog Description

PHYS 350/520 Intermediate Experimental Physics I	3 credit hours
Prerequisites: PHYS 242 and PHYS 331	6 lab hours

Perform required fundamental experiments in areas of mechanics, optics, modern physics, and heat. Short presentations to other classmates and instructors and competence in writing scientific papers and reports are emphasized. Effectiveness in the collection of data is important. Computers will be routinely used to for data collection and analysis.

II. Course Objectives

Upon completion of the course, students will be exposed to laboratory related experiences that will contribute to their ability to independently:

1. Design and develop experiments that illustrate and empirically test important concepts and principles of mechanics, optics, modern physics, and thermodynamics.
2. Plan and perform experimental operations involving resource acquisition and set-up, data collection, analysis, and reporting.
3. Utilize computers and hardware interfaces to perform data collection and analysis.
4. Present oral progress reports to a group in an informal setting.
5. Write formal reports and scientific papers based on experimental investigations.

III. Course Outline

1. Students are expected to complete a minimum of five experimental projects from at least eight working laboratory experiments. This includes reading all of the necessary lab materials and writing an abstract that demonstrates knowledge of the background material and objective of the lab before working with the equipment.
2. Twice during the semester, students will present a brief “chalk-talk” on one of their completed labs. They will present the background physics for the lab and describe what principles the experiment tests and what data and analysis is necessary to demonstrate the objective of the lab.
3. Students will keep lab notebooks. The lab notebooks will contain notes on reading materials, apparatus set-up notes, data collections notes and tables, analysis calculations (not done on a computer), and error analysis calculations (not done on a computer).

4. Students will submit a formal lab report on each of the five experiments that they perform. The first two lab reports will be returned to the students with the opportunity for revision before the final grade for that report is determined. Lab reports are expected to be 7-10 pages, typewritten. An example lab report and pointers for lab reports are available on D2L.
5. Students shall write a term paper (in the *American Journal of Physics* format) by the end of the semester. A topic of interest will be chosen by the student and approved by the instructor(s) by the fourth week of the semester. These may be based on the laboratory experiments or a new topic of interest in contemporary physics.

IV. Evaluation

The final grade for the course shall consist of the following:

Written Laboratory Reports: 50% (10% for each report)

These shall be graded on format, clarity, content, and the quality of the analysis. The reports must be supported by the laboratory notebooks. A grading rubric is available that explains the grading criteria.

Term Paper: 20%

Term papers will be graded for the quality of the research scholarship, the clarity of presentation and consistency with accepted journal article formatting standards. A grading rubric is available that explains the grading criteria.

Abstracts: 15%

Abstracts for each lab are graded for evidence that the student has read of the requisite materials, discerned the point of the lab and understands what data and analysis will be necessary to achieve the goals of the lab.

Presentations, Participation and Lab Notebooks: 15%

The two chalk talk presentations and student involvement, questions and inquisitiveness during the presentations will count towards the overall grade. Lab notebooks will be reviewed twice during the semester by the instructors, without prior notice. The presentations, participation and lab notebooks are graded using the following criteria.

1. Presentations (10%, combined with participation)
 - a) Competence with the material
 - b) Poise
 - c) Effective communication with peers
2. Participation (10%, combined with presentations)
 - a) Asking pertinent questions during presentations
 - b) Interaction with classmates
 - c) Interest in the subject
3. Notebooks (5%)
 - a) Are the notebook entries legible?
 - b) Can the student articulate to an instructor what was done in an experiment from the information in the lab notebook?

- c) Can a peer reconstruct what was done in an experiment from the information in the lab notebook?

V. Required Textbook

Intermediate Experimental Physics I – provided as handouts for each experiment

Suggested References:

1. Experimentation, an Introduction to Measurement Theory and Experiment Design. D.C. Baird, Prentice Hall, 1988.
2. Experimental Physics, Modern Methods. R.A. Dunlap, Oxford University Press, 1988.
3. Building Scientific Apparatus. a Practical Guide to Design and Construction. J.H. Moore, C. Davis, M.A. Coplan, Addison-Wesley Publishing Co., 1983.

VI. Lab Reports: 50% of the final grade in this course is based on the lab reports. An example lab report and pointers for graphical analysis and error analysis are on D2L.

The suggested format for the laboratory report is as follows:

- a. COVER SHEET: The cover sheet should include the experiment title, names of the author and each lab partner and the submission date. See the sample report.
- b. INTRODUCTION/PURPOSE: A brief statement describing the objectives of the laboratory exercise.
- c. THEORETICAL BACKGROUND: A description of the theory associated with the problem at hand. Any derivation of equations used should be concise. Emphasize the physics behind the equations. Remember to cite all references including your laboratory manual.
- d. EQUIPMENT: A list of all equipment and supplies used in the experiment. Use pictures, and diagrams as appropriate.
- e. PROCEDURE: A description of the working apparatus and the experimental process. Be concise and clear with sufficient details for others to reproduce and verify the results.
- f. DATA: This section shall contain a clear description of all data taken and associated errors and uncertainties in measurements. Also include all physical constants that are used in the experiment. Present the data in graphs or tabular form when possible.
- g. CALCULATIONS AND ANALYSIS: Provide sample calculation of relevant quantities. Use graphical analysis and curve fitting whenever possible with clear visuals (graphs and tables). Use a separate subheading for presentation of error analyses. Show sample calculations for uncertainties based on error propagation. Compare your results to known values and report percent discrepancies.

- h. **CONCLUSIONS:** This is where you strive to correlate and reconcile the theoretical and experimental results and to explain why any discrepancy may have arisen. Remember to cite all references.

VI. Title IX Required Statement

The Indiana University of Pennsylvania and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a University-approved research project.

Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the Department of Human Services (1-800-932-0313) and University Police (724-357-2141). Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: <http://www.iup.edu/social-equity/policies/title-ix/>

ASSIGNMENT SHEET – LAB REPORTS

After performing each of the experiments in this laboratory, lab partners are expected to independently write up their own lab reports. The lab partners are expected to be independent from each other after the data is taken. They can talk to each other about what they are writing, the data analysis and the error analysis, but they should not write the report together or check each other's calculations or the conclusions reached from their analyses.

All lab reports are to be written using a word processor; the expected length of the report is 7-10 type-written pages. An example lab report is on D2L. Pointers for lab reports, data analysis and error analysis for lab reports are also on D2L.

GRADING RUBRIC: Lab reports will be graded according to the following criteria.

CRITERIA	EXEMPLARY 4 - 5 points	COMPETENT 2 - 3 points	BEGINNING 0 - 1 points
Is the report clearly organized? Is the writing clear, concise and to-the-point? Does the presentation clearly flow from one section to the next using easy-to-follow transition statements? Does the student write in proper sentences and use good grammar? 0 - 5 points	Report fully meets these parameters. Well-organized presentation, good grasp of the material, explains the material well and shows a good knowledge of the audience.	Report meets parameters. Presentation may be lacking in some technical aspects of the material presented. Presentation does not flow well in certain places	Does not meet parameters. Lacking in numerous technical aspects of the material presented. Paper does not flow well in numerous places.
Does the report make adequate use of diagrams, pictures and presentation in the description of the experimental apparatus and procedure? 0 - 5 points	Report fully meets these parameters. Competent reader could recreate this experimental setup.	Report meets parameters. Presentation may break down in a few important areas.	Does not meet parameters. Presentation breaks down in numerous important areas.
Does the report make proper use of equations and graphs in the background and theory section, and use tables and graphs as necessary in the presentation of data? 0 - 5 points	Theory and background are clearly presented. Equations, graphs, and tables used effectively and as necessary	Presentation could be improved in one or more areas. Background/theory section may be lacking in a few areas. Data presentation is adequate but can be improved.	Presentation of theory and background is cursory or shows deficiency in knowledge. Data presentation is cursory or could be significantly improved.
Does the report contain a competent and relevant error analysis of the data and the calculations? 0 - 5 points	Error analysis is present and competent as necessary for the data and analysis presented.	Error analysis may be somewhat lacking in some technical aspects.	Error analysis is significantly lacking in one or more aspects.
Is the summary and conclusion clearly articulated and follow logically from the data presentation, data analysis and error analysis? 0 - 5 points	Proper interpretation of results, clearly presented	Summary and conclusion may be lacking in a few technical area.	Summary and conclusion is significantly lacking in one or more areas.

ASSIGNMENT SHEET – TERM PAPER

A term is due at the end of the semester. The due date is the date of the scheduled final exam for the class. The length of the paper is 10-15 type written pages. The subject of the paper is a scientific or technical topic of your choice. Example term paper topics are: (1) A physics topic of the student's choice, for example "Black Hole Physics", (2) An experimental technique, for example "Electron Paramagnetic Resonance", (3) A physical theory, for example "What is Quantum ElectroDynamics, or QED", and (4) An experiment in the PHYS 350 laboratory, performed with an increased scope or in greater detail or with more extensive data and error analysis.

There are two intermediate deadlines for this term paper. At approximately 4 weeks into the semester a term paper title, abstract and two references for topic approval by the instructors is due. Secondly, by the end of the week after Thanksgiving break, the student will turn in the term paper Introduction and Background section and provide an outline for the rest of the paper.

An example term paper can be found on D2L.

GRADING RUBRIC: Term papers will be graded according to the following rubric.

CRITERIA	EXEMPLARY 4 - 5 points	COMPETENT 2 - 3 points	BEGINNING 0 - 1 points
Is there evidence of a concerted effort over a significant time? Did the student meet intermediate deadlines with output showing significant connection to the final product? 0 - 5 points	Paper fully meets this parameter.	Paper meets parameter. Presentation may show some significant "last week" effort in some areas.	Does not meet parameters. In one or more sections of the paper, it reads like a first-cut or rough draft.
Is the language clear and concise? Does the student write in sentences and use good grammar? 0 - 5 points	Report fully meets this parameter.	Report meets parameter. May show unclear language or improper grammar in a few areas.	Does not meet parameters. Writing shows significant deficiencies in numerous areas.
Basic scholarship; has the student demonstrated adequate research into the topic? 0 - 5 points	Report fully meets this parameter.	Scholarship is adequate for the level of presentation but could be improved significantly in some areas.	Paper is significantly lacking in depth of research and/or shows inadequate grasp of material.
Proper adherence to the formatting guidelines in <i>The American Journal of Physics</i> , including proper footnote format and documentation of sources 0 - 5 points	Report fully meets this parameter.	Paper shows some deficiencies from formatting guidelines.	Paper shows significant deficiencies from formatting guidelines. Inadequate references for source material.

CRITERIA	EXEMPLARY 4 - 5 points	COMPETENT 2 - 3 points	BEGINNING 0 - 1 points
Proper use of diagrams, pictures, graphs and tables for presentation of materials and data, as necessary 0 - 5 points	Report fully meets this parameter.	Proper use of diagrams, pictures, graphs and tables for presentation of materials could be improved in one or more areas.	Significant deficiencies in the use of diagrams, pictures, graphs and tables
Organized outline and presentation; clear easy-to-follow transitions between sections Appropriate voice for the audience 0 - 5 points	Report fully meets this parameter.	Organization and flow is adequate but could be improved. May demonstrate insufficient knowledge of audience in some places.	Paper is not clearly organized and not easy to follow. Demonstrates inadequate knowledge of audience.