

SOUTHEAST MISSOURI STATE UNIVERSITY

Department(s): Physics and Engineering Physics

Course No. PH/EP378/578 (1)
PH/EP379/579 (2)

Revision: _____ **New:** 9/2012

Title of Course: Interdisciplinary Research

I. Description and Credit Hours of Course:

A. Course Description for Undergraduate Bulletin:

Original research for students of superior ability in majors other than engineering physics, physics, or physics education. May be repeated once for credit. (1-2)

B. More Extensive Course Description:

A student who desires to enroll in PH/EP378/578* and PH/EP379/579* Interdisciplinary Research should meet with an appropriate faculty member who will serve as the research supervisor. The nature of the research will then be established to the mutual satisfaction of the student and faculty member. This meeting should take place prior to the semester in which the student enrolls for credit.

The attached Approval Request Form should then be filled out by the student with the help of the research supervisor. The research supervisor will need to verify that the student has the necessary prerequisites. This information can normally be obtained from the student's advisor or from the department chairperson. The student and faculty director will then sign the approval form and submit it to the department chairperson for his signature. It will then be sent to the dean of the college for his signature. Copies of the approval form will be made and given to the student, research supervisor, and chairperson.

Upon successful completion of the project, the faculty director will sign the attached Course Completion Form, which will be turned in to the department chairperson to be filed for permanent record. The faculty director may choose to have the student give an oral presentation of the project at a student/faculty seminar, Physics and Engineering Club meeting, or other suitable forum prior to establishing a grade in Interdisciplinary Research (for PH/EP378 and PH/EP379). For PH/EP578 and PH/EP579, a final research report must be submitted prepared according to ACS/AIP/IOP/Elsevier manuscript style.

*Only graduate students can be enrolled in 578/579 course numbers.

II. Prerequisite: PH120, CH185, BI151 and permission of instructor.

III. Purposes or Objectives of the Course:

- A. To design nanoscale materials and explore basic properties (**physical, chemical, and biological**) of novel nanostructures and their potential applications in various fields of biomedical engineering.
- B. To develop novel measurement approaches for evaluating the basic properties of the smart nanostructures.
- C. To explore the interaction between novel nanostructures and mammalian cells.
- D. To prepare scientific research/technical report, and communicate research results in national / international conferences or in scientific journals.

IV. Student Learning Outcomes (Minimum of 3):

- A. Students will demonstrate appropriate application of interdisciplinary skills and knowledge to the performance of an undergraduate research project.
- B. Students will demonstrate an ability to effectively analyze and interpret research results .
- C. Students will demonstrate an ability to effectively communicate the results of their research project.

V. Expectations of Students:

- A. Students are expected to attend all research related activities and complete all assignments on time.
- D. Students are expected to maintain a laboratory research notebook detailing all analyses and results from those analyses.
- E. Students are expected to perform satisfactorily on all research assignments, individual projects, and other activities.
- F. Graduate Students will have extended research which will include additional experimentation, and greater depth of analysis.

VI. Course Content or Outline (indicate number of class hours per unit or section):

- A. Formulation of a research problem – 2 weeks
- B. Research strategy – 2 weeks
- C. Experimental setup – 6 weeks
- D. Laboratory data taking and analysis – 6 weeks
- E. Report preparation – 16 weeks (simultaneously with tasks A-D).

VII. Textbook(s) and/or Other Required Materials or Equipment:

In addition to standard word processing software, students must have routine access to high-speed internet, Microsoft Excel or equivalent spreadsheet software, and NIH Image J (available for free of cost) software. Manuals and handouts containing detail description of the experimental procedure will be supplied to each student. No textbook required.

VIII. Basis for Student Evaluation:

<u>Undergraduates</u>		<u>Graduate Students</u>	
Lab Performance	40 %	Lab Performance	40 %
Laboratory Notebook	40 %	Laboratory Notebook	40 %
Quiz and Final Presentation	20 %	Report and Final presentation	20 %

Grading Scale

<u>Undergraduates</u>	<u>Graduate Students</u>
90% - 100% = A	90% - 100% = A
80% - 89% = B	80% - 89% = B
70% - 79% = C	70% - 79% = C
60% - 69% = D	

The weight of the evaluation criteria may vary according to each instructor and will be communicated at the beginning of the course.

There is no "D" grade in the graduate school. Graduate students scoring below 70% will earn a failing grade.

Academic Policy Statement:

Students will be expected to abide by the University Policy for Academic Honesty regarding plagiarism and academic honesty. Refer to:

<http://www6.semo.edu/judaffairs/code.html>

Student with Disabilities Statement:

If a student has a special need addressed by the Americans with Disabilities Act (ADA) and requires materials in an alternative format, please notify the instructor at the beginning of the course. Reasonable efforts will be made to accommodate special needs.

Southeast Missouri State University
Department of Physics and Engineering Physics

INTERDISCIPLINARY RESEARCH

Student: _____ Semester: _____ Year _____

Instructor: _____ Credit: PH/EP 378/578 (1 hr)____ PH/EP 379/579 (2 hr) _____

Verification of Prerequisites:

1. Prior credit hours in Interdisciplinary Research _____
(A student may repeat these courses once for credit.)
2. Semester hours completed _____
(A student must have completed a minimum of 60 semester hours prior to scheduling Interdisciplinary Research.)
3. Prerequisites _____
(A student must have completed: PH 120, CH 185, and BI 151)
4. Grade point average _____
(A student must have a minimum cumulative 3.0 grade point)
5. Maximum 3 credit hours will be counted towards PH/EP Minor.

Description of Project (Please attach additional pages if necessary):

Approval:

Signature of Student and Date

Signature of Instructor and Date

Signature of Chairperson and Date

Signature of Dean and Date

Southeast Missouri State University
Department of Physics and Engineering Physics

Course Completion Form

INTERDISCIPLINARY RESEARCH

Name of Student: _____

Name of Faculty Advisor: _____

Credit Hours: _____

Date Initiated: _____

Date Completed: _____

Grade Received: _____

Title of Project: (Include comments, if applicable)