

**THE COLLEGE OF NEW JERSEY  
DEPARTMENT OF PHYSICS  
Project Proposal for PHY 493 - Independent Research II**

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**NAME:** \_\_\_\_\_ **PAWS ID:** \_\_\_\_\_

**Fall, Spring, Summer, 20** \_\_\_\_\_ **GPA:** \_\_\_\_\_

**MAJOR:** \_\_\_\_\_ **JR/SR** \_\_\_\_\_ **E-MAIL** \_\_\_\_\_

**TOTAL COURSE LOAD (INCLUDING IND RES)** \_\_\_\_\_ **COURSE UNITS**

**PHYSICS DEPARTMENT GUIDELINES:**

- Students must meet with their faculty mentor at least once a week.
- A minimum of 14 hours of effort per week (per course unit) is expected for successful completion of the Independent Research.
- At the conclusion of the Independent Research, all students will submit a written report and give an oral or poster presentation.

**PREREQUISITE FOR PHY 493 AS CAPSTONE:**

The prerequisite for admission to PHY 493 (as a Capstone experience) is 1.0 course units of PHY 393. At least 0.5 course units of PHY 393 must be with the same instructor as the intended PHY 493 instructor.

**Instructor and Semester of PHY393 prerequisite:** \_\_\_\_\_

See the reverse side for some Independent Research requirements and read the full departmental syllabus for this course for a fuller discussion of expectations, evaluation and grading.

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State the specific problems, questions, or goals you intend to pursue in this study as well as the procedures you intend to use. (Typed statements are preferred.)

**THIS APPLICATION IS FOR** \_\_\_\_\_ **COURSE UNITS OF CREDIT.**

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
DATE Faculty Supervisor

\_\_\_\_\_  
DATE

\_\_\_\_\_  
Department Chairperson Approval

\_\_\_\_\_  
DATE

## PHY 493 – INDEPENDENT RESEARCH IN PHYSICS II

### **I. Basic Course Information**

PHY 493 is a Writing Intensive, upper level course in the physics curriculum open to all students in their senior year with at least a 2.5 overall GPA. This is a capstone course and thus is normally only taken by seniors; however, juniors with a GPA of 3.0 and above and a strong justification (e.g. plans to study abroad in their senior year) may also take PHY 493. The prerequisite for admission to PHY 493 is 1.0 course units of PHY 393. At least 0.5 course units of PHY 393 must be with the same instructor as the intended PHY 493 instructor. To register for this course a student must obtain permission from a faculty mentor who agrees to supervise the research project, the Chairperson of the Physics Department and the Assistant Dean of Science. Independent Research experiences have the goal of producing new knowledge by the student in collaboration with a faculty member and/or with fellow student researchers and a faculty member.

The subject matter of the research experience will be agreed upon by a faculty mentor and the student. The experience will involve laboratory or observational experiences or complex calculations beyond what is covered in a lecture/laboratory course. It is expected that the research will build upon the knowledge gained by students in courses offered by the Department. This course is normally taken for 1.0 CU and in lieu of one of the standard 4 courses taken each semester.

### **II. Learning Goals**

1. To obtain a deeper understanding and application of the scientific method.
2. To read and discuss the literature relevant to the research project.
3. To enhance a student's ability to obtain and analyze data, find correlations between variables, and draw conclusions.
4. To write a research quality paper based on the outcomes of the project and to present an oral summary of their work to the department.

### **III. Assessment**

Students will be continually assessed, by the faculty mentor, based on their weekly progress. Furthermore, weekly meetings between the student and the faculty mentor will insure that a high quality product will be the outcome of the experience. Students are required to attend department seminars and colloquia.

At the end of the semester, students must present the results of their research to the faculty members and students of the Physics Department. Students will be required to produce a research quality paper concerning their project. The required paper will include an abstract and sections on theory, methodology, results and discussions, and a summary or conclusions. Portions will be presented to the faculty mentor, throughout the semester, for feedback and corrections. Multiple iterations are expected before a final paper is delivered at the end of the semester.

### **IV. Learning Activities**

The learning activities will be decided by the faculty mentor and will be specific to each faculty-student designed research experience. Examples of these activities include:

1. Laboratory, field, or observatory experiences, computer modeling of physical systems, application of spectroscopic and microscopic techniques.
2. Data analysis using advanced mathematical techniques or correlation methods.
3. Presentation of results using Power Point or other audio visual techniques.
4. Writing a research paper in a style appropriate to the specific field of research chosen.