

# COURSE OUTLINE

Course Number  
PHY 293

Course Title  
Honors Research in Physics I

Credits  
2

Hours:  
Lecture/Lab/Other  
0/5/0

Pre-requisite  
PHY101 or PHY115

Implementation  
Spring 2023

## Catalog description:

Under the guidance of an area sponsor in an industrial or academic environment, students participate in a physics research project. This course requires a written and oral presentation to students and faculty. It may be applied to fulfill a technical elective requirement in the Biology, Chemistry or Physics program or other program upon the program coordinator's approval. *5 laboratory hours per week*

Participation in Biology, Chemistry and Physics laboratory courses is permitted provided the student has completed the required prerequisites, is a minimum of 16 years of age or by the permission of the instructor and the Dean of the division.

General Education Category:  
Not GenEd

Course coordinator:  
Jing Huang  
(609) 570-3429  
huangj@mccc.edu

## Required texts & Other materials:

Student Lab Notebook

## Course Student Learning Outcomes (SLO):

***Upon successful completion of this course the student will be able to:***

1. demonstrate understanding of the physics concepts, laws, and principles [Supports ILG #3; PLO #1]
2. Solve laboratory problems by applying their knowledge and experience with modern equipment. [Supports ILG #3, #4, and #11; PLO #3]
3. Demonstrate their knowledge and experience with modern equipment. [Supports ILG #3, #4; PLO #4]
4. Demonstrate ability to communicate effectively [Supports ILG#1, #3, and #4; PLO #5]

## Course-specific Institutional Learning Goals (ILG):

**Institutional Learning Goal 1. Written and Oral Communication in English.** Students will communicate effectively in both speech and writing.

**Institutional Learning Goal 2. Mathematics.** Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

**Institutional Learning Goal 3. Science.** Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

**Institutional Learning Goal 4. Technology.** Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

**Institutional Learning Goal 10. Information Literacy: Students** will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

**Institutional Learning Goal 11. Critical Thinking: Students** will use critical thinking skills to understand, analyze, or apply information or solve problems.

### **Program Learning Outcomes for Physics (PLO)**

1. Students are expected to develop a framework of knowledge, including concepts, laws, and principles
2. Students are expected to develop problem-solving skills for theoretical problems
3. Students are expected to develop hands-on problem-solving skills
4. Students are expected to develop hands-on experience with modern laboratory equipment
5. Students are expected to develop communication skills

### **Units of study in detail – Unit Student Learning Outcomes:**

#### **Unit I**      [Research] [Supports Course SLOs #1, #2, #3, #4]

##### **Learning Objectives**

##### ***The student will be able to...***

- Construct, execute then evaluate a research plan in a research laboratory related to physics
- Develop skills in observation, organizing and analyzing data, synthesizing information, and communicating conclusions orally and in writing
- Demonstrate a working knowledge of basic physics concepts and methods
- Conduct literature searches and communicate findings orally and in writing
- Perform physics experimentation using proper scientific and laboratory safety procedures and maintaining an accurate and complete laboratory notebook
- Construct slides and present the research project to faculty and students

MERCER COUNTY COMMUNITY COLLEGE

Science & Health Professions  
Division Honors Research  
Laboratory  
BIO 293/294/295/296 Biology  
CHE 293/294/295/296  
Chemistry PHY  
293/294/295/296 Physics

**STUDENT**

Name: Student ID #: \_

e-mail address: Phone #\_

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**MCCC ADVISOR**

Name: e-mail address: Phone#: \_

**RESEARCH ADVISOR**

Name: Facility: e-mail address: \_

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**Student Responsibilities: Please read carefully.**

1. You are required to devote a minimum of 5 hours/week of time in the research lab working on your project. Under no circumstances are you to work on unauthorized lab projects.
2. Specific days/time in the lab should be coordinated and agreed upon by you and the Research Advisor. In the event of an absence, it is your responsibility to notify the Research Advisor and make up the missed scheduled time.
3. On a weekly basis, you are to contact the MCCC advisor either by e-mail or verbal communication, to keep them informed of your progress in the lab.
4. Between weeks 6 and 8 of the semester, the MCCC advisor will schedule a meeting at the facility so that you can review your research project. The scheduled meeting time will be \_.
5. During the 14<sup>th</sup> week of the semester, you will present your research project at MCCC to the Science faculty, invited science students, guests and Research Advisor. The presentation should be about 15 to 20 minutes in length and should include the use of overhead transparencies or Power Point. Your presentation must be reviewed by the MCCC advisor several days prior to the presentation. Presentation date tentatively will be

6. You are required to keep a Research Logbook of your research that is up-to-date, accurate and thorough.

7. Your grade will be calculated as follows:

Research Advisor Evaluation:

33%

\*Mid-semester Project Review: 33%

\*\*Final Presentation: 33%

\*Determination by MCCC Advisor

\*\*Determined by both the MCCC Advisor & Research Advisor

Date: Student Signature: \_

MCCC Advisor Signature: \_

Research Advisor Signature: \_

When signed, please forward it to the MCCC advisor.

**MERCER COUNTY COMMUNITY COLLEGE  
SCIENCE AND HEALTH PROFESSIONS  
DIVISION**

**Honors Research  
Laboratory  
BIO 293/294/295/296 Biology  
CHE 293/294/295/296  
Chemistry  
PHY 293/294/295/296  
Physics**

**Final Student Evaluation by Research**

**Advisor Date:**

**Student:** \_

**Research Advisor:** \_

Please check the appropriate response for each question regarding the performance of the above-mentioned student at your facility this semester.

|   | <b>Excellen<br/>t</b> | <b>Good</b> | <b>Satisfactory</b> | <b>Unsatisfactory</b> |
|---|-----------------------|-------------|---------------------|-----------------------|
| 1. Preparation for lab                          |                       |             |                     |                       |
| 2. Attendance and punctuality                   |                       |             |                     |                       |
| 3. Cooperation with you                         |                       |             |                     |                       |
| 4. Cooperation with others                      |                       |             |                     |                       |
| 5. Attitude                                     |                       |             |                     |                       |
| 6. Laboratory performance                       |                       |             |                     |                       |
| 7. Organizational skills                        |                       |             |                     |                       |
| 8. Data collection skills                       |                       |             |                     |                       |
| 9. Quality and thoroughness of Research Logbook |                       |             |                     |                       |
| 10. Progress by the end of semester             |                       |             |                     |                       |

On an average, how many hours/weeks did the student devote to the research project?

\_\_\_ 6 hours/week

\_\_\_ more than 6 hours/week

Any additional comments:

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Numerical Project Grade (33% of final grade): \_

*This evaluation should be completed before the student's presentation and forwarded to*  
*- MCCC Advisor.*