

PHYS 3224/3230/3231: Introductory Research

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**Course description:**

**Number and title: PHYS 3224/3230/3231** Introductory Research (CRN vary by instructor)

**Credit hours:** 3.0 semester credit hour

**Catalog description:** This course is a supervised introductory research experience with Physics faculty at Clayton State University. Students must articulate clear project goals and objectives. Students will learn to demonstrate the use of scientific literature and document their progress using a research notebook. The project will be summarized in a written research paper and an oral presentation to the department faculty. Students will be assigned a grade for this course based on evaluation by the supervisor and other Clayton State University faculty.

**Course co-requisite:** None

**Course prerequisite(s):** PHYS 2212/2212L. See individual instructors for other possible prerequisite courses. PHYS 1112/1112L may be considered as well.

**Computer Requirement:** Each Clayton State University student is required to have ready access throughout the semester to a notebook computer that meets faculty-approved hardware and software requirements for the student's academic program. For further information on Clayton State University's Official Notebook Computer Policy, please go to <http://itpchoice.clayton.edu/policy.htm>.

**Computer skill prerequisites:** You must be able to use Windows, Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Outlook Express (including attaching and retrieving files via e-mail), and a Web browser. Other skills may be required by individual instructors.

**Use of Student Notebook Computers**

Students may be required to use their laptop computers in this course depending on the requirements of the research project.

**Course objectives**

* Students will learn how search for primary literature on a topic of interest.
* Students will learn how to read and analyze peer-reviewed journal articles.
* Students will learn how to collect and analyze data from their research projects.
* Students will learn how to present their data in a written and oral format.
* Students will have a good understanding of background information for their specific project based on material from the primary literature.
* Students will learn to perform and will understand appropriate techniques specific to their specific project.
* Students will master laboratory safety.
* Students will learn how to set up and keep a scientific notebook.

**Specific for project/faculty sponsor**

See faculty sponsor to obtain the specific learning objectives for your project.

**Student Learning Outcomes:**

**Physics Outcomes:**

**•** Outcome 1: Demonstrate knowledge of the basic principles of major fields in physics.

• Outcome 2: Use a spreadsheet and/or self-written code for data analysis and graphing.

• Outcome 3: Use scientific methods in collecting data, formulate and test a hypothesis, reach an informed conclusion based on learned material.

• Outcome 4: Collect, read, analyze, and interpret data to draw valid scientific conclusions and communicate those conclusions in a clear and articulate manner.

• Outcome 5: Relate knowledge of the other sciences, such as computational, to physical concepts and skills.

**Chemistry Outcomes:**

 This course supports outcomes 1, 2, 3, 5, 6, and 8 of the chemistry major:

* Outcome 1: Demonstrate knowledge of the basic principles of major fields of chemistry.
* Outcome 2: Demonstrate a broad range of basic laboratory skills applicable to chemistry, and improved chemical research skills.
* Outcome 3: Demonstrate knowledge of technology related to chemistry, including laboratory instrumentation.
* Outcome 5: Communicate scientific information in a clear and concise manner both orally and in writing.
* Outcome 6: Collect, evaluate and interpret scientific data, and employ critical thinking to solve problems in chemistry and supporting fields.
* Outcome 8: Identify and describe the impact of chemistry on society.

**Biology outcomes:**

This course supports outcomes 2, 3, 4, and 5 of the biology major:

* Outcome 2: Demonstrate a mastery of a broad range of basic lab and technology skills applicable to biology.
* Outcome 3: Apply knowledge of physical science, mathematics, and statistics to biological concepts.
* Outcome 4: Communicate scientific information in a clear, concise manner both orally and in writing.
* Outcome 5: Demonstrate the ability to collect, evaluate and interpret scientific data, and employ critical thinking to solve problems in biological science and supporting fields.

**Instructor information:**

The instructors for this course vary each semester. Please see the schedule for the list of instructors for a given semester: <http://apps.clayton.edu/courses/schedule>

**Class meetings:** To be arranged with faculty sponsor. Faculty and student must be able to meet for a minimum amount of time weekly (typically a **minimum** of 6 hours weekly depending on the nature of the project; more time may be required to complete the project) or as set by the faculty sponsor. **You must have faculty approval to register for the class.**

**Textbook information:** None

**Requirements:**

* Get approval from a faculty sponsor to do research by filling out the Faculty Sponsor Form for Research[.](http://a-s.clayton.edu/science/Symposium/Faculty%20Sponsor%20Form_research.doc) The signed form should be turned into to your faculty sponsor or to Department Chair so that you can be registered for the course.
* Student will complete appropriate safety training with their faculty sponsor.
* Student will participate in field work and/or laboratory work required to complete the project.
* Student will write either a paper in the form of a peer reviewed journal (consisting of but not limited to: Abstract, Introduction, Materials and Methods, Results, and Discussion, Works Cited) **OR** make a poster of the research project (same sections as paper).
* **Student will present his/her work in poster form to the School of Sciences faculty**. The faculty reviewing the presentation will determine the letter grade for the poster presentation. The time of the presentation will be arranged with the faculty sponsor.
* Students will keep a laboratory notebook as instructed by the faculty sponsor; the notebook will be turned in to the faculty sponsor at the end of the term.
* Students should be prepared to work a **minimum** of 6 hours per week on this project for 2-3 hour blocks. **Time per week and numbers of hours per block of time will vary with the project.**

**Evaluation and grading:** Students will be evaluated using the grading rubrics found on the Faculty Sponsor Form for Research [.](http://a-s.clayton.edu/science/Internship_Forms.htm)

**University Attendance Policy:**

Students are expected to attend and participate in every class meeting. Instructors establish specific policies relating to absences in their courses and communicate these policies to the students through the course syllabi. Individual instructors, based upon the nature of the course, determine what effect excused and unexcused absences have in determining grades and upon students’ ability to remain enrolled in their courses. The university reserves the right to determine that excessive absences, whether justified or not, are sufficient cause for institutional withdrawals or failing grades.

**Course Attendance Policy:**

Research schedule will be set by the faculty sponsor and **attendance is mandatory**. Lack of attendance may result in an F or reduced score in the course.

**Course policies:**

* E-mail: Important messages and announcements will be sent to you via your Clayton State University account. You must activate your account and check your e-mail regularly.
* **No visitors may enter the lab/active research area without the permission of the instructor for the safety concerns.**

**General policies:**

* Students must abide by policies in the [Clayton State University Student Handbook,](http://adminservices.clayton.edu/studentaffairs/StudentHandbook/foreword.htm) and the [Basic Undergraduate Student Responsibilities.](file:///%5C%5C168.28.240.45%5CW3_Doc%5Ca-s.clayton.edu%5CBasicUndergraduateStudentResponsibilities.htm)
* Visitors, including children, are not allowed in the laboratory.
* No smoking, other use of tobacco, eating, or drinking is permitted at any time in the laboratory.
* Any type of activity that is considered dishonest by reasonable standards may constitute academic misconduct. The most common forms of academic misconduct are cheating and plagiarism. All instances of academic dishonesty will result in a grade of zero for the work involved. All instances of academic dishonesty will be reported to the Office of Student Life/Judicial Affairs. Judicial procedures are described at [http://adminservices.clayton.edu/judicial/.](http://adminservices.clayton.edu/judicial/)

**Disruption of the Learning Environment:**

 Behavior which disrupts the teaching–learning process during class activities will not tolerated. While a variety of behaviors can be disruptive in a classroom setting, more serious examples include belligerent, abusive, profane, and/or threatening behavior. A student who fails to respond to reasonable faculty direction regarding classroom behavior and/or behavior while participating in classroom activities may be dismissed from class. A student who is dismissed is entitled to due process and will be afforded such rights as soon as possible following dismissal. If found in violation, a student may be administratively withdrawn and may receive a grade of WF. A more detailed description of examples of disruptive behavior and appeal procedures is provided at: [http://a-s.clayton.edu/cclower/Disruptive Classroom Behavior.doc](http://a-s.clayton.edu/Disruptive%20Classroom%20Behavior.doc)

**Academic Dishonesty**
Any type of activity that is considered dishonest by reasonable standards may constitute academic misconduct. The most common forms of academic misconduct are cheating and plagiarism. All instances of academic dishonesty will result in a grade of zero for the work involved. All instances of academic dishonesty will be reported to the [Office of Community Standards](https://www.clayton.edu/community-standards/). Judicial procedures are described in the section of the Academic Catalog and Student Handbook titled, [Adjudicating Alleged Academic Conduct Infractions](https://catalog.clayton.edu/student-handbook/student-policies/disciplinary-procedures/procedures-adjudicating-alleged-academic-conduct-infractions/).