

New Core Component Proposal

Date Submitted: 11/07/18 10:32 am

Viewing: **PHYS 227-GE : Electricity and Magnetism Laboratory for students in the sciences**

Last edit: 01/25/19 4:08 pm

Changes proposed by: skessler

Faculty Senate Number FS.36.263

Contact(s)

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Course Prefix PHYS Course Number 227

Academic Level UG

Complete Course Title Electricity and Magnetism Laboratory for students in the sciences

Abbreviated Course Title ELECTRICITY AND MAGNETISM LAB

Crosslisted With

Semester Credit 1

Hour(s)

Proposal for:
Core Curriculum

How frequently will the class be offered?
Every fall, spring and summer

Number of class sections per semester 15

Number of students per semester 300

Historic annual enrollment for the last three years

Last year: Previous year: Year before:

Core curriculum

Foundational Component Area
Core Life/Physical Sci (KLPS)

TCCN prefix/number 2126

Foundational Component Area: Life/Physical Sci

In Workflow

1. **PHYS Department Head**
2. **SC College Dean UG**
3. **CCC Preparer**
4. **CCC Chair**
5. **Faculty Senate Preparer**
6. **Faculty Senate**
7. **Provost II**
8. **President**
9. **Curricular Services**

Approval Path

1. 09/27/18 11:17 am
Lewis Ford (a-ford):
Approved for PHYS Department Head
2. 09/27/18 11:27 am
Lucas Macri (Imacri):
Approved for SC College Dean UG
3. 10/10/18 3:04 pm
Barbara West
(barbwest): Approved for CCC Preparer
4. 10/17/18 2:28 pm
Barbara West
(barbwest): Rollback to Initiator
5. 11/07/18 11:36 am
Lewis Ford (a-ford):
Approved for PHYS Department Head
6. 11/07/18 5:03 pm
Lucas Macri (Imacri):
Approved for SC College Dean UG
7. 11/08/18 9:42 am
Barbara West
(barbwest): Approved for CCC Preparer
8. 11/20/18 12:16 pm
Barbara West
(barbwest): Approved for CCC Chair
9. 11/26/18 1:32 pm
Betsy Peterson
(betsypeterson):
Approved for Faculty Senate Preparer
10. 12/12/18 9:29 am
Betsy Peterson
(betsypeterson):
Approved for Faculty Senate
11. 01/16/19 10:18 am
Cathy Cordova

(ccordova): Approved
for Provost II
12. 01/25/19 4:08 pm
Cathy Cordova
(ccordova): Approved
for President

How does the proposed course specifically address the Foundational Component Area definition above?

This course provides hands-on laboratory experience in describing, measuring and quantifying the electric and magnetic forces and effects related to various electromagnetic phenomena, including electrostatics, DC and AC circuits, magnetic phenomena, and electromagnetic induction. Students gain experience in practical application of scientific method by confronting theories and models with experimental data and also by applying the new knowledge for solving physics problems and analyzing real-life examples.

Core Objectives:

Critical Thinking (to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information):

Critical thinking is developed by guiding students to have their own discovery experience, without ever directly providing the answers or detailed instructions on how to verify the specific laws or how to accomplish the specific task related to the projects. Students have to critically analyze experimental data that they have taken in order to decide whether their measurement results support their model and what are the reasons for any discrepancies. They learn to collect all the information to make a conclusion regarding the validity of physical laws describing the phenomenon under study.

Communication (to include effective development, interpretation and expression of ideas through written, oral and visual communication):

Oral communication skills are addressed directly during the laboratory work where the students work in teams (4 students per team) to find the solution to the given sets of practical challenges. These type of activity engages the active communication of all members of the team, and clearly enhances effective oral communication among members. The success of the team is critically dependent on the communication skills and their ability to learn from peers. Furthermore, oral communication skills are used and assessed when a student discusses with instructor the physical concepts at the basis of each lab experiment and the experimental setup, based on the required reading of the pre-lab instructions and corresponding chapter of a textbook.

Written communication skills are developed and assessed in the process of preparing a competent report of every lab, which contains the experimental data, error analysis, and assessment of validity of a physical model.

Students develop visual analysis and communication skills in order to analyze complex graphical information associated with each experiment such as a scheme of the experimental setup, any circuitry, or a scheme of connection to the measurement equipment; create scientific graphs based on the experimental data they obtain, including any applicable error bars; use proper graphical information in the lab report.

Empirical and Quantitative Skills (to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions):

The Quantitative skills are addressed by requiring advanced analysis of the experimental results that includes not only the general proof of specific physics laws but also quantitative analysis of experimental data, detailed error analysis, and error propagation. Completing lab projects according to specifications requires application of advanced quantitative skills. Students will develop advanced empirical skills in the process of setting up their experiment, taking experimental data, and evaluating measurement errors.

Teamwork (to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal):

Teamwork is a fundamental component of the laboratory activities where the students work in teams of four. The instructors are trained in stimulating the discussion among team members, rather than providing direct answers so that the team members work together to reach their own solutions to experimental challenges. Participation of all members of the team and the development of team-effort behavior will be one of the main focal points of the course.

Additional Comments PHYS 208 is being replaced by PHYS 207 (3 hours) and 227 (1 hour). PHYS 227 covers the material students learned in the lab that was part of PHYS 208 (4 hours). PHYS 207 is approved for the core curriculum.

Approved for core? No

Please ensure that the attached course syllabus sufficiently and specifically details the appropriate core objectives.

Attach Course Syllabus [PHYS 227 syllabus - Fall 2019 - Final.pdf](#)
[FS Jan19.pdf](#)

Reviewer Comments **Barbara West (barbwest) (10/17/18 2:28 pm)**: Rollback: CCC did not approve as submitted. May be resubmitted with modifications to address issues: The same problem as with PHYS 226. No visual communication mentioned and an unclear assessment of oral communication.
Cathy Cordova (ccordova) (01/25/19 4:08 pm): Approved on behalf of President's Office, approval memo dated 1/11/19, received 1/24/19.