PHYS 135: ELECTRICITY AND MAGNETISM

In Workflow

1. PHYS Committee Chair (mikkel.jensen@csus.edu)
2. PHYS Chair (ctaylor@csus.edu)
3. NSM College Committee Chair (mikkel.jensen@csus.edu)
4. NSM Dean (datwyler@csus.edu)
5. Academic Services (curriculum@csus.edu)
6. Senate Curriculum Subcommittee Chair (curriculum@csus.edu)
7. Dean of Undergraduate (james.german@csus.edu; renee.leonard@csus.edu)
8. Dean of Graduate (cnewsome@skymail.csus.edu)
9. Catalog Editor (catalog@csus.edu)
10. Registrar's Office (k.mcfarland@csus.edu)
11. PeopleSoft (PeopleSoft@csus.edu)

Approval Path

1. Wed, 30 Nov 2022 18:13:15 GMT
   Mikkel Jensen (mikkel.jensen): Approved for PHYS Committee Chair
2. Mon, 05 Dec 2022 21:48:00 GMT
   Chris Taylor (ctaylor): Approved for PHYS Chair
3. Wed, 07 Dec 2022 23:42:32 GMT
   Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Thu, 08 Dec 2022 17:42:40 GMT
   Shannon Datwyler (datwyler): Approved for NSM Dean

Date Submitted: Wed, 30 Nov 2022 04:10:12 GMT

Viewing: PHYS 135 : Electricity And Magnetism

Last edit: Wed, 07 Dec 2022 23:42:22 GMT

Changes proposed by: Mikkel Jensen (218650862)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
Mikkel Herholdt Jensen	mikkel.jensen@csus.edu	916-278-7687

Catalog Title:
Electricity And Magnetism

Class Schedule Title:
Electricity And Magnetism

Academic Group: (College)
NSM - Natural Sciences & Mathematics

Academic Organization: (Department)
Physics and Astronomy

Will this course be offered through the College of Continuing Education (CCE)?
No

Catalog Year Effective:
Fall 2023 (2023/2024 Catalog)

Subject Area: (prefix)
PHYS - Physics

Catalog Number: (course number)
135

Course ID: (For administrative use only.)
158421

Units:
3

Is the only purpose of this change to update the term typically offered or the enforcement of existing requisites at registration?
No

In what term(s) will this course typically be offered?
Spring term only

Does this course require a room for its final exam?
Yes, final exam requires a room

This course complies with the credit hour policy:
Yes

Justification for course proposal:
The department has formulated formal learning outcomes for the course, but these were never entered into the Form A workflow system. This is being remedied here.

The course has been offered only in the Spring semester for the past several years, and this proposal updates the catalog to accurately.

Finally, the prerequisites are being updated, though the change is non-substantive. MATH 45 is being removed as an explicit prerequisite, since PHYS 105 requires the completion of the entire calculus series (MATH 30, 31, 32) as well as MATH 45. Additionally, the course is intended to require the entire lower-division Physics-11 series (PHYS 11A, 11B, and 11C), but only 11C was listed in the catalog. In practice, this update doesn't affect students' progress to degree, as they have completed all the lower-division physics courses by the time they take PHYS 135.

Course Description: (Not to exceed 80 words and language should conform to catalog copy.)
Development of electromagnetic theory from basic experimental laws; electrostatics, electric currents, magnetostatics, electric and magnetic properties of matter, induction, Maxwell's equations, conservation laws, introduction to electromagnetic waves.

Are one or more field trips required with this course?
No

Fee Course?
No

Is this course designated as Service Learning?
No

Is this course designated as Curricular Community Engaged Learning?
No

Does this course require safety training?
No

Does this course require personal protective equipment (PPE)?
No

Does this course have prerequisites?
Yes

Prerequisite:
PHYS 11A and PHYS 11B and PHYS 11C, PHYS 105.

Prerequisites Enforced at Registration?
Yes

Does this course have corequisites?
No

Graded:
Letter

Approval required for enrollment?
No Approval Required

Course Component(s) and Classification(s):
Discussion

Discussion Classification
CS#04 - Lecture /Recitation (K-factor=1 WTU per unit)
Discussion Units
3

Is this a paired course?
No

Is this course crosslisted?
No

Can this course be repeated for credit?
No

Can the course be taken for credit more than once during the same term?
No

Description of the Expected Learning Outcomes and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Predict the electrostatic field of simple charge distributions.	Quizzes, homework, midterms, final exam.
2	Calculate the electrostatic field due to a given distribution of charge using Coulomb's Law and Gauss's Law where appropriate.	Quizzes, homework, midterms, final exam.
3	Calculate the electrostatic potential due to a localized charge distribution.	Quizzes, homework, midterms, final exam.
4	Utilize the relationship between electrostatic field and electrostatic potential to calculate one from the other, as well as conceptually predict one from the other.	Quizzes, homework, midterms, final exam.
5	Apply the fundamental properties of conductors to solve electrostatics problems.	Quizzes, homework, midterms, final exam.
6	Explain conceptually how electric fields affect conductors and predict the charge distributions for simple cases.	Quizzes, homework, midterms, final exam.
7	Calculate the electrostatic energy stored in a given configuration of charge.	Quizzes, homework, midterms, final exam.
8	Apply Laplace's equation in two and three dimensions, in Cartesian and spherical coordinates, to solve boundary value problems.	Quizzes, homework, midterms, final exam.
9	Explain conceptually how electric fields affect non-conducting media, specifically the physical mechanisms behind polarization.	Quizzes, homework, midterms, final exam.
10	Calculate the magnetostatic field due to a given distribution of steady current using the Biot-Savart Law and Ampere's Law where appropriate.	Quizzes, homework, midterms, final exam.
11	Explain conceptually the relationship between electricity and magnetism.	Quizzes, homework, midterms, final exam.
12	Explain conceptually how magnetic fields affect matter, specifically the physical mechanisms behind paramagnetism, diamagnetism, and ferromagnetism.	Quizzes, homework, midterms, final exam.

Attach a list of the required/recommended course readings and activities:
PHYS 135 S22 Syllabus.pdf

Is this course required in a degree program (major, minor, graduate degree, certificate?)

Yes

Has a corresponding Program Change been submitted to Workflow?

No

Identify the program(s) in which this course is required:

Programs:
BA in Physics
BA in Physics (Teacher Preparation)
BS in Physics
BS in Physics (Applied Physics)
BS in Physics (Biophysics)

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?

No

Will there be any departments affected by this proposed course?

No

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.

I/we agree

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Knowledge of human cultures and the physical and natural world
Intellectual and practical skills

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

GE Course and GE Goal(s)

Is this a General Education (GE) course or is it being considered for GE?

No

Key: 3912