

TO: College of Arts and Sciences Curriculum Committee

FROM: Lyle Ford, Interim Chair
Department of Physics and Astronomy

DATE: October 5, 2020

RE: Program Change

We request implementation of the following program change with the next possible *Catalog*.

Names of Programs: Physics, Applied Physics Emphasis, Major

Program Codes: 230-203

Date of Department/Program Approval: September 24, 2020

From Current Catalog Web Pages: <https://catalog.uwec.edu/undergraduate/arts-sciences/physics-astronomy/physics-major-applied-physics-ba-bs/>

To: Required courses not counted toward credits in major:

MATH 312 Differential Equations and Linear Algebra
MATH 345 Introduction to Probability and Mathematical Statistics
PHYS 240 Computational Physics¹
or CS 145 Programming for New Programmers²
or CS 163 Introduction to Programming in C++²
or CS 170 Computing for the Sciences and Mathematics²

Select one of the following:

CHEM 115 Chemical Principles
CHEM 103 & 104 General Chemistry I and General Chemistry II
CHEM 105 & CHEM 106 & CHEM 109 General Chemistry Lecture I and General
Chemistry Laboratory and General
Chemistry II with Lab

¹Many upper division physics courses require proficiency in Python so PHYS 240 is preferred.

²If CS 145, CS 163 or CS 170 is taken, Python proficiency will be required prior to enrollment in relevant upper division physics courses. Contact the department to complete the required programming exercise.

Why: A number of upper division physics courses incorporate exercises that can only be solved using computational approaches. Physics majors are required to take a computer science course (currently CS 163 or CS 170) but some wait until after they take the upper division courses for which programming skills are useful. The department is adding a computer programming prerequisite to these courses and creating a new course in computational physics (PHYS 240) to better meet the needs of the upper division courses. The department has chosen Python as the preferred language for the upper division courses to ensure skills honed in one course can be more easily transferred to others. Python will be taught in PHYS 240. Students who have learned a different language in CS 145, CS 163, or CS 170 will not be required to take PHYS 240 to learn Python but will have to show proficiency in the language to satisfy the prerequisite for the upper division courses. The department will develop a programming exercise that will allow students who choose this alternate path to show they can perform the programming tasks needed for the upper division courses.