



CORE CURRICULUM

Requirement

Natural Science (Physics-Based) - Core

Date:

Department(s)/Program(s):

Faculty Contact Person(s):

Department Chair/Program Director:

Supported by Department/Program Faculty? Yes No

Course Number & Title: *Note: Course must be approved to run by Faculty Senate before being evaluated by the CCC*

RATIONALE | Natural Science (Physics-Based)

Science provides an empirical analysis of truth in the natural order and approaches the natural world from the unique perspective of the scientific method. Students should be able to dissect an argument and determine if it truly meets the criteria of science, or if it simply uses scientific-sounding words and phrases to hide a flawed analysis. They should be able to appreciate the compatibility of reason and faith in the pursuit of truth.

In the Dominican tradition, study is undertaken not only for itself but also for the benefit of others. In engaging with the pressing issues of the day (such as embryonic stem cells, global warming, and the wise use of energy resources), and committed to service and the common good, graduates must be prepared to look beyond labels and catch phrases to the basic scientific facts and data which will provide a foundation for realistic solutions. Students need to be able to integrate religious, philosophical, political, and scientific viewpoints into a coherent whole in order to make effective decisions for the betterment of society. This background will enable Providence College students and graduates to make informed decisions about important scientific issues that affect society.

OBJECTIVES | Natural Science

Please explain how the proposed course fulfills the following objectives for the Natural Science (physics-based) Requirement. **Point to where in the syllabus each objective is met and explain how students will be held accountable through assignments and assessments.** If there are multiple sections that meet the objectives in different ways, specify how, using examples from each syllabus.

Characterize the scientific method by demonstrating the dependence of science on quantitative and testable empiricism, the way scientific theories and models are developed, and the dynamic nature of scientific theories.



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OBJECTIVES | Natural Science | Cont'd

Present a body of contemporary scientific information drawn from the natural sciences and, where appropriate, address issues that have a significant impact on the world to give students a foundation from which to understand better the interrelatedness of the sciences and society.

Illustrate a scientific perspective, describing how scientists study the natural world, and how this differs from other forms of study.

Hands-on Activities: Give students significant opportunities to illustrate the role of testable empiricism in the development of scientific theories via classroom, laboratory, or project activities.

ADDENDUM TO PHYSICS-BASED OBJECTIVES: The Physics-Based Natural Science core requirement was introduced into the Core Curriculum to ensure that students who did not take physics in high school would learn the basic concepts of physics. Since a high school physics course would treat basic concepts of physics mathematically, at least at the level of high school algebra, such mathematical treatment is expected for courses satisfying the Physics-Based Natural Science core requirement.

A satisfactory Physics-Based Natural Science proposal should indicate that central concepts, as indicated below, are presented mathematically as appropriate and that students are required to demonstrate mathematical competence in physics. Specific mathematical techniques need not be specified, but a purely qualitative presentation of concepts is insufficient.

1. Indicate which of the following physics concepts will be covered in the course

Motion and Forces

Conservation of Energy and Momentum

Heat and Thermodynamics

Waves

Electric and Magnetic phenomena



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2. Explain how these basic physics concepts are essential to the focus of the course. If basic physics concepts covered in the course are not listed above, please name them and explain how they are essential to the course. Indicate also which concepts are presented mathematically.

3. What percentage of the course is devoted to basic physics concepts?

COURSE SYLLABUS | Natural Science (Physics-Based)

*Email CCC@providence.edu with this completed form **and** your syllabus/syllabi attached.

Note: It is expected that in accordance with the [approved syllabus guidelines](#), the final syllabus will include the following:

- An indication of which Core requirement(s) the course satisfies
- A listing of the Core objectives for the requirements