

**Core Curriculum Course Submission
Criteria: Science**

1. General Information

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|--------------------------------------|-----------------------------------|-------------------------|----------------|
| a. Originating Person | b. Contact Person's E-mail | c. Contact Phone | d. Date |
| Al Adams | ajadams@ualr.edu | (501)554-3856 | 4/4/14 |
| e. College/School | f. Department/Program | | |
| College of Arts, Letters, & Sciences | Physics & Astronomy | | |

Submission Statement
By submitting this form, we acknowledge our understanding that the Core Council has the authority to review approved courses to ensure they continue to meet the established goals and outcomes of that category of the core; that the Council has authority to develop a core assessment program; and that the Council will be developing review and assessment policies by the end of 2014. Further, we agree that if this course is approved, we will participate in the university-wide assessment of the core.

Chair and Dean Awareness
Your department chairperson and college dean must be made aware of your submission for core. By submitting this form, you are acknowledging that this has occurred.

2. Course Information

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| a. Course ID | b. Current Title |
| PHYS 1321/PHYS 1121 | College Physics I/College Physics I Laboratory |

c. Catalog Description

Prerequisite: Grade of C or better in MATH 1302 or MATH 1401. Introduction to the fundamental principles underlying the foundations of classical and modern physics, including kinematics, Newtonian mechanics, fluids, thermodynamics, simple harmonic motion, and wave motion. An algebra-based course designed for majors in the life sciences, pre-professional students, and engineering technology students, but is open to any student who meets the prerequisites. Three hours lecture, one hour optional discussion. Three credit hours.

d. How will your department ensure a level of consistency among sections of this course? Who will be responsible for this?

The Department of Physics and Astronomy has a standing Curriculum Committee charged with overseeing the introductory courses along with the associated laboratories. During the week prior to the beginning of each semester the departmental Curriculum Committee will meet with the instructors for the sections of PHYS 1321 and PHYS 1121 and review educational goals, the learning outcomes, the learning objectives, and the assignments that support the objectives and share the syllabi from previous semesters. During the first week of classes each semester the Curriculum Committee will review the course syllabus as created by the section instructors to make sure all the guidelines for Core Courses are being met.

| Educational Goals | Learning Outcomes students will... | Learning Objectives: At the end of the course students will be able to... | Assignments | Explanation |
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| Knowledge 1 – Concepts, methodologies, findings, and applications of mathematics and the social and natural sciences, engineering and technology. | 1. understand the theoretical perspective used in one or more science discipline; | Learning Objectives 1.1 Apply the principles and concepts of Newtonian and Statistical Mechanics that govern motion, force, work, energy, fluids, heat, oscillatory motion, and mechanical waves. | Assignments 1.1 Weekly quizzes, in-class exercises, periodic exams, online homework | Explanation 1.1 Students review the text and hear a brief lecture about the various topics in introductory physics but the mastering of the concepts comes from active learning exercises and working problems. In working exercises in a team setting and solving problems either in a group setting or as individuals, students develop the knowledge and skills required to apply concepts to answer conceptual questions and find numerical solutions to specific physical scenarios. |
| | 2. understand observational and experimental methods used in one or more of the sciences; | Learning Objectives 1.2 Gather data, analyze data, model data, and carry out error analysis in validation laboratories, also design and carry out an original experiment that tests a hypothesis | Assignments 1.2 Perform laboratories over the course of a semester, review the course content relevant for the laboratory, make measurements, model the data mathematically, write a report for each of the laboratories, do a post-laboratory assessment. Given a question to explore students will develop a hypothesis, design a measurement to test it, analyze and interpret the data. | Explanation 1.2 Students experience firsthand the nature of science by making measurements and then using sound reasoning skills to interpret the data and form models that provide a useful way to think about the physical system. Students will be required to plan and implement a measurement to test a hypothesis, then analyze and interpret their results in the context of their hypothesis. |
| | 3. understand applications and limitations of the sciences; | Learning Objectives 1.3 Distinguish the ways of knowing offered by science from other non-science ways of knowing; identify and quantify the accuracy and precision of | Assignments 1.3 Students will write a paper which includes a section devoted to the nature of science, identifying examples of current relevance that fall within and outside the | Explanation 1.3 Science focuses on those aspects of knowledge that lend themselves to measurement and verification. Students should be able to distinguish topics which are valid |

| | | quantitative data as limiting factors in validating models and interpretations. | purview of science; students will include error analysis in their laboratory reports. | scientific questions from those which are not. Students should also recognize that measurements and data are limited in accuracy. |
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| Educational Goals | Learning Outcomes students will... | Learning Objectives: At the end of the course students will be able to.. | Assignments | Explanation |
| Skills 1 – Communication | 1. develop an understanding of how to communicate scientific procedures, results from the inquiry and conclusions resulting from applying the scientific method; | Learning Objectives 1.1 Gather and organize data and the present experimental results and interpretations in a written format | Assignments 1.1 In-class exercises, quizzes, laboratory exercises and reports | Explanation 1.1 Weekly laboratory sessions, in addition to in-class exercises, will model the scientific method starting with hypothesis and ending with interpretation of results. Assignments require clear and adequately explained methods and results and conclusions and error analysis. |
| Educational Goals | Learning Outcomes students will... | Learning Objectives: At the end of the course students will be able to... | Assignments | Explanation |
| Skills 2 – Critical Thinking, Quantitative Reasoning, and Solving Problems Individually and Collaboratively | 1. develop basic skills from the scientific method including inquiry, data collection, analysis, and interpretation in order to explore a scientific problem from hypothesis testing to formulating a conclusion based on the inquiry; | Learning Objectives 2.1 Identify all the important aspects of a scientific experiment; demonstrate the ability to carry out all the important aspects of a scientific experiment | Assignments 2.1 Carry out a laboratory exercise starting with hypothesis, then designing the experiment, then implementing the experiment, then analyzing the data, then making sound inferences from the data, then preparing a formal report describing each of the parts of the project | Explanation 2.1 In the lecture course students will be asked to illustrate and characterize the scientific measurement process from hypothesis formation through published results. In the laboratory course students will actually model that process. |
| | 2. learn about the world through observation and experimentation, through modeling and interpretation, and through analysis and evaluation; | Learning Objectives 2.2 Identify and model sound scientific experimentation and mathematical modeling of the data | Assignments 2.2 Carry out laboratories and perform in-class exercises which model the scientific process of observation and experimentation and data analysis | Explanation 2.2 In the class students will give examples of the scientific process of gathering data, organizing and presenting it in a clear and succinct manner. Students will master this process through repeated |

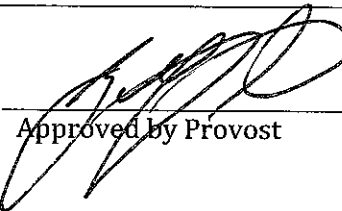
| | | | | laboratory measurements and written laboratory reports. |
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| Educational Goals | Learning Outcomes students will... | Learning Objectives: At the end of the course students will be able to... | Assignments | Explanation |
| Skills 3 – Information Technology | 1. develop and apply technological tools for inquiry, analysis, and presentation of scientific information and data; | Learning Objectives 3.1 Demonstrate the ability to use word processing and spreadsheet programs, in addition to the graphing calculator or computer mathematical software and electronic interfaces for laboratory measurements | Assignments 3.1 In class exercises, special assignments, and laboratories reports, in addition to exams and quizzes | Explanation 3.1 Programs that aid all aspects of the scientific process, especially data gathering, manipulation , and analysis and presentation will be a part of both the lecture and the laboratory experience |
| Educational Goals | Learning Outcomes students will... | Learning Objectives: At the end of the course students will be able to.. | Assignments | Explanation |
| Values 1 – Personal Responsibility and Ethical Behavior | 1. take responsibility for completing assignments in an ethical manner, working on one’s own when required and acknowledging resources when used; | Learning Objectives 1.1 Programs that aid all aspects of the scientific process, especially data gathering, manipulation , and analysis and presentation will be a part of both the lecture and the laboratory experience | Assignments 1.1 On each quiz and exam requiring individual work, students sign a declaration statement that no help was provided by another person and no help was provided to another person; on all team projects and the written paper for the course identify and acknowledge all resources | Explanation 1.1 By signing a declaration statement with each graded assignment students will be continually reminded of the ethical standards which govern our society |
| | 2. develop an understanding of the ethical obligations in conducting research, and of being precise and accurate with data, including how this obligation applies to communication of information; | Learning Objectives 1.2 Identify and critique what constitutes responsible conduct in research | Assignments 1.2 Read the 2009 report from the National Academies "On being a Scientist: A Guide to Responsible Conduct in Research" and summarize its key points in a paper or an open response question on an exam | Explanation 1.2 Advancement of scientific knowledge requires sound ethical conduct in research and all students of science should recognize what is expected of those who strive to advance science. |

| Educational Goals | Learning Outcomes students will... | Learning Objectives: At the end of the course students will be able to... | Assignments | Explanation |
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| Values 2 - Civic Responsibility | 1. develop an understanding of the ethical issues that may result when applying scientific knowledge that is incomplete. | Learning Objectives 2.1 Understand and articulate the ethical societal issues which flow from existing states of knowledge | Assignments 2.1 Written assignment | Explanation 2.1 Science courses traditionally do not devote teaching and learning time to questions of ethics and current texts don't include specific discussions of ethical questions. A written paper or an open response question on an exam will now require students in PHYS 1321/1121 to analyze the ethical implications of a current scientific question |

Additional Comments:

Belinda Blewins-Knabe
 Approved by Core Curriculum Committee

5-6-14
 Date



Approved by Provost

5/7/14
 Date

Anderson Jm
 Approved by Chancellor

5/8/14
 Date