Proposal to Initiate, Modify or Delete a Course

1. Type of Action
   - Addition
   - Regular or Experimental or Other
   - Deletion
   - Modification: in credits, in title, in number or alpha, in prerequisites or co-requisites, Other

2. New Alpha, Number and Title
   - Physics 170

3. Credits
   - 4 credits

4. Old Alpha, Number and Title
   - General Physics

5. Credits
   - *

6. New Catalog Description
   - This is the first of a rigorous, calculus based, course in physics for the professional or engineering majors. The study of the concepts of physics including the fundamental principles and theories of mechanics, energy, waves, and thermodynamics.

7. Select box and type specific information in text box.
   - Prerequisite: credit for Math 205 or Math 216 or equivalent. Corequisite: Phys 170L

8. Student Contact Hours Per Week
   - Lecture: 4
   - Lecture/Lab: Lab

9. Proposed Date of First Offering
   - Semester: Spring 2007
   - Year: 2004

10. This course makes no difference in the number of credits required for the program/core.

11. Equivalent or similar courses offered in the UH System:

<table>
<thead>
<tr>
<th>Campus</th>
<th>Alpha, Number, Title</th>
<th>Campus</th>
<th>Alpha, Number, Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td>Physics 170</td>
<td>KapiolaniCC</td>
<td>Physics 170</td>
</tr>
<tr>
<td>UH Manoa</td>
<td>Physics 170</td>
<td>KauaiCC</td>
<td>Physics 170</td>
</tr>
<tr>
<td>West Oahu</td>
<td>None</td>
<td>LeewardCC</td>
<td>Physics 170</td>
</tr>
<tr>
<td>HawaiiCC</td>
<td>None</td>
<td>MauiCC</td>
<td>Physics 170</td>
</tr>
<tr>
<td>HonoluluCC</td>
<td>Physics 170</td>
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</tbody>
</table>

12. This course is (check one and click in appropriate textbox and provide details):
   - Already articulated with Physics 170 General Physics I

Provide details of existing or desired articulation (date, college(s), purposes, pre-major, etc.) in this space:

- Appropriate for Articulation with Physics 170 General Physics I

Provide details of existing or desired articulation (date, colleges(s), purposes, pre-major or major, etc.) in this space:

- Not yet appropriate for Articulation.

13. Reason for Initiating, Modifying or Deleting Courses or Other Pertinent Comment:
   - To provide a physics course for physics, astronomy, or engineering majors.

Requested by: [Signature] Date: 1/17/04
Approved by: [Signature] Date: 10/12/04
Dean of Instruction: [Signature] Date: 11/19/04
Provost: [Signature] Date: 10/19/04

CCCM #6100 (Amended for WCC use October 2002)
Levels of Review of Course Proposal at Windward Community College

Course Alpha, Number, and Title: Physics 170 General Physics I

<table>
<thead>
<tr>
<th>Signatures</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joseph E. Ciotti</td>
<td>12-4-03</td>
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<tr>
<td></td>
<td>12/4/02</td>
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<tr>
<td></td>
<td>12/4/03</td>
</tr>
<tr>
<td>David Brownell</td>
<td>12/15/03</td>
</tr>
<tr>
<td>Department Chairperson</td>
<td></td>
</tr>
<tr>
<td>Was this course discussed in a department meeting? ☑ Yes ☐ No</td>
<td>12/4/03</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Division</th>
<th>5/4/04</th>
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<table>
<thead>
<tr>
<th>Curriculum Committee Review</th>
<th>10/12/04</th>
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</thead>
<tbody>
<tr>
<td>Approved ☑</td>
<td></td>
</tr>
<tr>
<td>Disapproved ☐</td>
<td></td>
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</tbody>
</table>

Reason:

Jean Sudeyura
Curriculum Committee Chairperson
WCC Form for New Course Proposals
(This sheet was originally pink.)

1. How is this course related to the education needs and goals of the College/Department/Community as reflected in the EDP/ADP?

   The department is tasked to provide a physical science requirement for the liberal arts students. This course will provide preparation for students seeking more scientifically oriented careers, such as physics, astronomy, or engineering.

2. Provide details of any additional staff, equipment, facilities, library/media material, faculty preparation and other financial support that would be required to implement this course. (Include an estimate of the actual cost of supplies and equipment.) What has been done to provide for these additional costs for the proposed date of offering? Who will teach the course?

   An additional instructor will be required. The equipment and facilities are identical to those used in the current physics 151 course.

3. Is a similar course taught elsewhere in the UH system? Yes If yes, provide details of how this course differs from existing similar courses.

   This course, as proposed, is taught elsewhere in the UH system with no differences.

4. Is this course experimental and/or unique to Windward Community College? No If yes, provide rationale and details of its impact on the College Curriculum

5. Is a similar course taught in the upper division level by a 4-year UH college? No If yes, explain why this course is appropriate at the lower division or how it differs from its upper division counterpart.

6. Please attach a complete course outline. Your course outline should address all the items listed in the Guidelines for Course Outlines.

7. If this course is numbered 100 or above or appropriate for transfer to a 4-year college, complete and attach WCC Form for Transfer Courses (blue). See criteria for transfer courses.
Course Alpha and Number: Physics 170 General Physics I

Submitted by: J. Hudson/J. Ciotti

Date: March 2, 2004

1. List the counterpart to this course on any 4-year UH campus. Describe the relationship between the course and any related baccalaureate program area.

   This is the first of a rigorous, calculus-based, course for professional or engineering majors. The study of the concepts of physics including the fundamental principles and theories of mechanics, energy, waves, and thermodynamics, with an emphasis on problem solving. As such, any quantitative science major could make use of this course to fulfill a Natural Science requirement. This course is referred to as Physics 170 General Physics I at UH Manoa.

2. Is this course taught or accepted by major accredited colleges or universities? Give one or two examples.

   Yes. Georgetown University

3. Please attach a complete course outline if you have not done so already. Your course outline should address all the items listed in the Guidelines for Course Outlines.
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
Articulation with 4-year UH Campus Form

COURSE ARTICULATION FORM (GENERAL EDUCATION CORE)

ORIGINATING CAMPUS: Windward Community College DATE SUBMITTED: December 11, 2003

COURSE ALPHA & NUMBER: Physics 170 SEMESTER CREDITS: 4

COURSE TITLE: General Physics I

DATE OF OUTLINE: December 11, 2003 Year *

(** Representative outline, no multiple syllabi, please.)

1. Articulation committee to review this course:

   Standing Committees
   - Written Communication [ ]
   - Mathematical & Logical Thinking [ ]
   - World Civilizations [ ]
   - Languages [ ]
   - Arts & Humanities [ ]
   - Natural Science [ ]
   - Social Science [ ]

2. The information in this item is required by the reviewing committee so that it has a starting point for reviewing the course. It is the responsibility of the submitting campus to do the necessary research to provide this information.

   In the opinion of the originating campus, this course is equivalent to the following and/or meets the criteria for the indicated core categories. Every core category space, except your own campus, must be filled in (can include ‘none’). An equivalent course, if known, may be helpful to committee members but is not required.

<table>
<thead>
<tr>
<th>Receiving Campus</th>
<th>Equivalent Course (Alpha and Number)</th>
<th>Core Category</th>
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</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td>Physics 170</td>
<td>NS II</td>
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<tr>
<td>UH Manoa</td>
<td>Physics 170</td>
<td>DP</td>
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<tr>
<td>UH West Oahu</td>
<td>None</td>
<td>None</td>
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<tr>
<td>Hawaii CC</td>
<td>None</td>
<td>None</td>
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<td>Honolulu CC</td>
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<td>NS II</td>
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<td>Kapiolani CC</td>
<td>Physics 170</td>
<td>NS II</td>
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<tr>
<td>Kauai CC</td>
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<td>NS II</td>
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<td>NS II</td>
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<tr>
<td>Maui CC</td>
<td>Physics 170</td>
<td>NS II</td>
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<tr>
<td>Windward CC</td>
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</tbody>
</table>

3. If submitted electronically, I understand that this outline will be posted to a publicly accessible web site to enable open access for reviewing committees and campuses. The outline will be taken off the site upon completion of the review.

   Typed Name or Signature

Note: If possible submit coversheet and course outline electronically as e-mail attachments (preferably in ‘pdf’ format). If submitting in printed form, 20 copies of coversheet and course outline are required for distribution for appropriate review.

Note: UCA Clearinghouse
John Muth, Office of the Chancellor for Community Colleges, is acting as staff to the University Council on Articulation and is responsible for tracking all courses submitted for articulation,
COURSE/CATALOG DESCRIPTION
Physics 170/ This is the first of a rigorous, calculus based, two semester course for professional or engineering majors. The study of the concepts of physics including the fundamental principles and theories of mechanics, energy, waves, and thermodynamics.

COURSE NAME
General Physics I

COURSE ALPHA
Physics 170

CREDIT/CONTACT HOURS
4 credits/4 hours of lecture per week
List hours per week of lecture, lab, and/or other activities and total student contact hours per week.

PREREQUISITES REQUIRED
Credit for, or concurrent registration in Math 206, Math 242, or Math 252. Math 216 may be substituted with consent.

CO-REQUISITES
none

RECOMMENDED PREPARATION AND BASIC SKILLS
This is a general physics course with an emphasis on problem solving. The student should understand algebra, trigonometry, and analytic geometry, as well as to be able to perform basic differentiation and integration.

If the course involves the use of mathematics, indicate the level of quantitative reasoning required.

SPECIFIC COURSE OBJECTIVES
Upon successful completion of PHYS 170, the student will be able to:
- demonstrate an understanding of the scientific method and the units by which quantitative measurements are made
- demonstrate an understanding of motion and apply kinematical equations to problems pertaining to linear motion, projectile motion, and motion in more than one dimension
- demonstrate an understanding of forces and apply the laws of dynamics as they pertain to motion and equilibrium
- demonstrate an understanding of torque and apply the laws of rotational dynamics as they pertain to rotational motion and equilibrium
- demonstrate an understanding of momentum and its application to collisions and systems of many particles
- demonstrate an understanding of work, energy, and power; how they are related, as well as their application to problem solving
- demonstrate an understanding of wave phenomena and other oscillatory methods of energy transfer
- demonstrate an understanding of temperature and the laws of thermodynamics

What knowledge and/or skills will successful completion of the course develop in the student?

METHOD OF INSTRUCTION
The lecture method will be used for this course. Students will be assigned weekly homework assignments to aid them in their understanding of the material covered. The assignments, and their solutions, will be discussed during the appropriate class sessions.

COURSE CONTENT AND APPROXIMATE TIME TO BE SPENT ON EACH TOPIC

<table>
<thead>
<tr>
<th>No. of 50 Minute Periods</th>
<th>Course Content</th>
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<tbody>
<tr>
<td>1</td>
<td>Scientific Method</td>
</tr>
<tr>
<td></td>
<td>What is an Hypothesis</td>
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<td>Measurement and Reality</td>
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<tr>
<td>2</td>
<td>Measurement</td>
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<td>Operational Definition of Measurement</td>
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<td>Why Metric?</td>
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<td>Dimensional analysis</td>
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<td></td>
<td>Density</td>
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<tr>
<td>3</td>
<td>Linear Motion</td>
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<td>Displacement, Velocity, and Speed</td>
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<td></td>
<td>Instantaneous Velocity and Speed</td>
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<td></td>
<td>Acceleration</td>
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<td>Graphical methods of analysis</td>
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<td></td>
<td>One dimensional motion with Constant Acceleration</td>
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<td>Freely Falling Objects</td>
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<tr>
<td>4</td>
<td>Vectors</td>
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<td></td>
<td>Coordinate Systems</td>
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<td></td>
<td>Vector and Scalar Quantities</td>
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<td>Vector Properties; Translation and Resolution</td>
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<td>Unit Vectors</td>
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<tr>
<td>5</td>
<td>Motion in Two Dimensions</td>
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<td></td>
<td>Displacement, Velocity, and Acceleration Vectors</td>
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<tr>
<td></td>
<td>Two Dimensional Motion with Constant Acceleration</td>
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<tr>
<td></td>
<td>Projectile Motion</td>
</tr>
<tr>
<td></td>
<td>Uniform Circular Motion</td>
</tr>
</tbody>
</table>
6. Dynamics and the Laws of Motion
   Newton's First Law and Inertia
   Newton's Second Law and Force
   Newton's Third Law and Collisions
   Frictional Forces
   Equilibrium

7. Work and Kinetic Energy
   Work done by a Constant Force
   Work done by a Varying Force
   Kinetic Energy and the Work-Energy Theorem
   Power

   Potential Energy
   Conservative and Non-conservative Forces
   Conservation of Mechanical Energy
   Work done by Non-conservative Forces
   Conservative Forces and Potential Energy

9. Linear Momentum and Collisions
   Linear Momentum and its Conservation
   Impulse and Momentum
   Collisions
   One Dimensional Collisions
   Two Dimensional Collisions
   Center of Mass
   Motion of Many Particle Systems

10. Rotational Motion
    Angular Displacement, Velocity, and Acceleration
    Rotational Inertia
    Rotational Kinematics
    Rotational Kinetic Energy
    Work and Power in Rotational Motion

11. Torque and Angular Momentum
    Rolling Motion of a Rigid Object
    Torque
    Angular Momentum
    Conservation of Angular Momentum

12. Gravitation
    Kepler's Laws of Planetary Motion
    Newton's Law of Universal Gravitation
    Measuring the Universal Gravitation Constant
The Gravitational Field
Gravitational Potential Energy

13. Oscillations
   Simple Harmonic Motion
   Energy of a Simple Harmonic Oscillator
   The Pendulum
   The Mass-Spring System
   Simple Harmonic Motion and Uniform Circular Motion

14. Wave Motion
   Transverse and Longitudinal Wave Motion
   One Dimensional Traveling Wave
   Superposition and Interference
   Wave Speeds and Resonance
   Sinusoidal Waves
   Doppler Effect

15. Temperature and Heat
   Temperature and the Zeroth Law of Thermodynamics
   Celsius, Fahrenheit, and Kelvin Scales
   Thermal Expansion

16. Kinetic Theory of Gases
   Heat and Internal Energy
   Heat Capacity and Specific Heat
   Latent Heats
   Work and Energy in Thermodynamic Processes
   The First Law of Thermodynamics

17. Entropy and the Second Law of Thermodynamics
   Heat Engines and The Second Law of Thermodynamics
   Carnot Engines and Efficiency
   Reversible and Irreversible Processes
   Entropy and Time

A proposed semester schedule is acceptable.

TEXT(S)
Possible texts include:
1. Fundamentals of Physics (5th Ed.)
   D. Haliday, R. Resnick, and J. Walker; J. Wiley & Sons Inc.
   College level reading. Roughly 50% of the text will be covered.

2. Physics for Scientists and Engineers (5th Ed.)
   R. Serway, R. Beichner, and J. Jewett; Saunders College Publishing
   College level reading. Roughly 50% of the Text will be covered.
REFERENCE AND SUPPLEMENTARY MATERIALS

In addition to the above mentioned texts, a number of text books used in introductory physics courses may be helpful to the student. Conceptual physics texts are available at the library. The student is expected to purchase a scientific calculator.

COURSE REQUIREMENTS

The student taking Physics 170 should be able to read at the English 100 level, have taken Math 205 (or its equivalent), and should have credit for, or be concurrently registered in Math 206. The student will be given a weekly problem assignment that will be collected at the beginning of the first lecture of the week. Three midterm examinations will be given throughout the semester. All students are expected to take the cumulative final exam.

EVALUATION

The final grade will be determined by a cumulative point total at the end of the semester based on the following weights:

- Homework 10%
- Midterm I 18%
- Midterm II 18%
- Midterm III 18%
- Final Exam 36%

The following scale will be used to determine the final grades:

- A 90 - 100%
- B 80 - 90%
- C 70 - 80%
- D 55 - 65%
- F < 55%

Identify methods of evaluation which will be employed to determine if the course objectives are being met (e.g., written examinations, attendance, projects). Specify the grading procedure to be used in the course.