University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course

1. Type of Action
   A. Addition
   B. Deletion
   C. Modification: in credits, in title, in number or alpha, in prerequisites or co-requisites
   (click and type to specify)

2. New Alpha, Number and Title
   Physics 272

3. Credits 3 credits
   General Physics II

4. Old Alpha, Number and Title

5. Credits *

6. New Catalog Description
   This is the second in a rigorous, calculus based, physics course for the professional or engineering major. The study of the concepts of physics including the fundamental principles and theories of electricity, magnetism, light, and optical theory.

7. Select box and type specific information in text box.
   Prerequisites: Math 2060 or equivalent.
   Corequisite: PHYS 271

8. Student Contact Hours Per Week
   Lecture 3
   Lab

9. Proposed Date of First Offering
   Semester Fall 2007
   Year 2005-

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 171</td>
<td>KapiolaniCC</td>
<td>Physics 272</td>
</tr>
<tr>
<td>UH Manoa</td>
<td>Physics 272</td>
<td>KauaiCC</td>
<td>Physics 272</td>
</tr>
<tr>
<td>West Oahu</td>
<td>None</td>
<td>LeewardCC</td>
<td>Physics 272</td>
</tr>
<tr>
<td>HawaiiCC</td>
<td>None</td>
<td>MauiCC</td>
<td>Physics 272</td>
</tr>
<tr>
<td>HonoluluCC</td>
<td>Physics 272</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

12. This course is (check one and click in appropriate textbox and provide details):
   □ Already articulated with Physics 272 General Physics II
   Provide details of existing or desired articulation (date, college(s), purposes, pre-major, etc.) in this space:
   □ Appropriate for Articulation with Physics 272 General Physics II
   Provide details of existing or desired articulation (date, college(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 continuation (2nd semester) of the calculus based general physics course for physics, astronomy, or engineering majors.

14. Requested by: 
   Approved by: 
   
   Date
   Date
   Date
   Date

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

Course Alpha, Number, and Title: Physics 272 General Physics II

<table>
<thead>
<tr>
<th>Signatures</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Department Area (more than one departmental instructor's signature required)</td>
<td>12-4-03</td>
</tr>
<tr>
<td>Joseph E. Crotti</td>
<td>12/6/03</td>
</tr>
<tr>
<td></td>
<td>12/4/03</td>
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</table>

<table>
<thead>
<tr>
<th>Department Chairperson</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>David Ruggiero</td>
<td>12/17/03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Division</th>
<th>5/4/04</th>
</tr>
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<tbody>
<tr>
<td>Jack A. Mulliken</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Curriculum Committee Review</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved ✓</td>
<td></td>
</tr>
<tr>
<td>Disapproved □</td>
<td></td>
</tr>
</tbody>
</table>

Reason:

<table>
<thead>
<tr>
<th>Curriculum Committee Chairperson</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Joan Shibuija</td>
<td>10/12/04</td>
</tr>
</tbody>
</table>

CCCM #6100 (Amended for WCC use October 2002)
University of Hawaii Community Colleges
Proposal to Initiate, Modify or Delete a Course
New Course Proposal Form – Go to next page for Course Modification)

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 152 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.

CCCM #6100 (Amended for WCC use September 2002)
Original dated WCC 9/91
Course Alpha and Number  Physics 272 General Physics II

Submitted by  J. Hudson/J. Ciotti

Date March 3, 2004

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

This is the second 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 electricity, magnetism, light, and optics, 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 272 General Physics II 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 272          SEMESTER CREDITS: 3

COURSE TITLE: General Physics II Laboratory

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>
</tr>
</thead>
<tbody>
<tr>
<td>UH Hilo</td>
<td>Physics 171</td>
<td>NS II</td>
</tr>
<tr>
<td>UH Manoa</td>
<td>Physics 272</td>
<td>DP</td>
</tr>
<tr>
<td>UH West Oahu</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Hawaii CC</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Honolulu CC</td>
<td>Physics 272</td>
<td>NS II</td>
</tr>
<tr>
<td>Kapiolani CC</td>
<td>Physics 272</td>
<td>NS II</td>
</tr>
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<td>NS II</td>
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<td>Physics 272</td>
<td>NS II</td>
</tr>
<tr>
<td>Maui CC</td>
<td>Physics 272</td>
<td>NS II</td>
</tr>
<tr>
<td>Windward CC</td>
<td></td>
<td></td>
</tr>
</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 272/ This is the second of a rigorous calculus based, two semester course for the professional or engineering majors. The study of the concepts of physics including the fundamental principles and theories of electricity, magnetism, light, and optical theory.

COURSE NAME
General Physics II

COURSE ALPHA
Physics 272

CREDIT/CONTACT HOURS
3 credits/3 hours of lecture per week

PREREQUISITES REQUIRED
Math 206. A grade of C or better in Physics 170.

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

SPECIFIC COURSE OBJECTIVES
Upon successful completion of PHYS 272, the student should be able to:
- demonstrate an understanding of charge and its relationship to the electric field
- demonstrate an understanding of voltage and the movement of charges
- demonstrate an understanding of electric currents, circuits, and the production of magnetic fields
- demonstrate an understanding of resistance and Ohm's law
- demonstrate an understanding of induction and Faraday's law
- demonstrate an understanding of light and electromagnetic phenomena
- demonstrate an understanding of the ray nature of light and the rules of geometric optics
- demonstrate an understanding of the wave nature of light, interference and diffraction
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 Periods</th>
<th>50 Minute Periods</th>
</tr>
</thead>
</table>

1. Electric charges
   - Properties of charges
   - Conductors and Insulators
   - Coulomb's Law

2. Electric Fields
   - Electric field lines
   - Electric field of a continuous charge distributions
   - Motion of charged particles in an electric field

3. Gauss's Law
   - Electric flux
   - Applications of Gauss's Law
   - Conductors in electrostatic equilibrium

4. Electric Potential
   - Potential differences in a uniform electric field
   - Potential energy due to a point charge
   - Determination of the electric field from the electric potential
   - Electric potential due to a continuous charge distribution
   - Electric potential due to charged conductors

5. Capacitance
   - Definition of capacitance
   - Calculating the capacitance
   - Combinations of capacitors
   - Energy stored within a capacitor
   - Dielectrics

6. Currents and Resistance
   - Electric current
   - Resistance and Ohm's law
   - Resistance and temperature
   - Electrical energy and power
7. Circuits
   Electromotive force
   Series and parallel circuits
   Kirchhoff’s rules
   RC circuits

8. Magnetic Fields
   Orested’s observation
   Magnetic force on a current carrying conductor
   Torque on a current loop in a magnetic field
   Motion of a charged particle in a uniform magnetic field
   The Hall effect

9. Magnetic Fields due to Currents
   Biot-Savart Law
   Ampere’s Law
   Solenoids
   Magnetic flux
   Gauss’s law of Magnetism
   Displacement currents

10. Induction and Inductance
    Faraday’s Law
    Lenz’s Law
    Induced Emf and electric fields
    Self-Inductance
    Energy stored in a Magnetic field
    Mutual Inductance
    LC circuit

11. Maxwell's Equations

12. Electromagnetic Waves
    Hertz’s discoveries
    Energy carried by an electromagnetic wave
    Momentum and radiation pressure
    Electromagnetic spectrum

13. Images
    Nature of light
    Measurements of the speed of light
    Ray approximation of light
    Reflection and refraction
    Huygen’s principle
    Dispersion
    Total internal reflection
Images formed by plane mirrors
Images formed by spherical mirrors
Images formed by thin lens

14. Interference
   Young's double slit experiment
   Double slit interference pattern
   Phase changes at reflection
   Interference in thin films

15. Diffraction
   Diffraction from narrow slits
   Single slit and circular apertures
   Resolution
   Diffraction grating
   Polarization of plane waves

A proposed semester schedule is acceptable.

TEXT(S)
Possible texts include:
1. Fundamentals of Physics (5th Ed.)
   D. Halliday, R. Resnick, and J. Walker; J. Wiley & Sons Inc.
   College level reading. Roughly 35% of the text will be covered.

2. Physics for Scientists and Engineers (5th Ed.)
   R. Serway, R. Beichner, and J. Jewitt; Saunders College Publishing
   College level reading. Roughly 40% of the text will be covered.

List text(s) to be used and reading level of text. Contact Learning Skills Center to determine reading level.
List text(s) to be used. If there is no text, so state. Indicate approximate percentage of text to be used if less than 75 percent.

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.
List materials that may be found in the library that will contribute to the course.

COURSE REQUIREMENTS
The student taking Physics 272 should be able to read at to English 100 level, have taken Math 206 (or its equivalent), and have received a grade of C or better from Physics 170. The student will be given a weekly problem assignment that will be collected at the beginning of the first lecture of the week. Three 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:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Exam I</td>
<td>18%</td>
</tr>
<tr>
<td>Exam II</td>
<td>18%</td>
</tr>
<tr>
<td>Exam III</td>
<td>18%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>36%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90 - 100%</td>
</tr>
<tr>
<td>B</td>
<td>80 - 90%</td>
</tr>
<tr>
<td>C</td>
<td>65 - 80%</td>
</tr>
<tr>
<td>D</td>
<td>55 - 65%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 55%</td>
</tr>
</tbody>
</table>

List any projects, field trips, experiments, reports, independent work, etc., which will be required or expected of students for the course.

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.
Instructor:  
Lecture:  
Office:  
Office hours:  
Telephone:  
e-mail:  

Textbook:  Fundamentals of Physics (5th Ed.)  
D. Haliday, R. Resnick, and J. Walker; J. Wiley & Sons Inc.  

Prerequisite: A grade of C or better in Phys 170 and Math 206 or equivalent.  

Course Description: This course is the second semester of a rigorous, calculus based study of physics. The primary topics of study deal with electricity, magnetism, light, and optical theory with an emphasis on problem solving. A conceptual understanding of physics principles will act as the foundation for further quantitative analysis.  

Course Goals: The student upon successful completion of this course will:  
1. demonstrate a solid conceptual understanding of electricity, magnetism, light, and optical theory.  
2. solve applicable problems using calculus and vector analysis.  
3. apply the laws of physics to computational problems in electricity, magnetism, and wave phenomena as it applies to optics.  

Materials Auxiliary: A simple calculator (non-QWERTY type) is required. For ESL students, a language exchange text may be used during exams, but no electronic translators will be allowed.  

Grading: The final grade will be determined by a cumulative point total at the end of the semester based on the following:  
  Homework  10%  
  Exam I  18%  
  Exam II  18%  
  Exam III  18%  
  Final Exam  36%  

The following scale will be used to determine the final grades  
A  90 - 100%  
B  80 - 90%  
C  65 - 80%  
D  55 - 65%  
F  < 55%
If an exam is missed, it can be made up providing the arrangements for the makeup exam are agreed to before the original exam time; i.e. *You need to inform the instructor before the time of the exam that you will be missing.* A valid excuse is required. A letter grade will be awarded based on the overall percentage scored. All students are required to take the comprehensive final exam at the end of the semester.

**Schedule: (tentative)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Orientation</td>
<td>Handout</td>
</tr>
<tr>
<td></td>
<td>Electric Charges</td>
<td>Chap. 22</td>
</tr>
<tr>
<td></td>
<td>Electric Fields</td>
<td>Chap. 23</td>
</tr>
<tr>
<td></td>
<td>Gauss' Law</td>
<td>Chap. 24</td>
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</tbody>
</table>

**Exam I**

|        | Electric Potential            | Chap. 25 |
|        | Capacitance                   | Chap. 26 |
|        | Current and Resistance        | Chap. 27 |
|        | Circuits                      | Chap. 28 |

**Exam II**

|        | Magnetic Fields               | Chap. 29 |
|        | Magnetic Fields due to Currents| Chap. 30 |
|        | Induction and Inductance      | Chap. 31 |
|        | Maxwell's Equations           | Chap. 32 |

**Exam III**

|        | Electromagnetic Waves         | Chap. 34 |
|        | Images                         | Chap. 35 |
|        | Interference                   | Chap. 36 |
|        | Diffraction                    | Chap. 37 |

**Final Exam**

**Addendum:** If, during an exam, you are paged or called by cellular phone, this must be an emergency. As such, the exam will be immediately collected, and you are dismissed. No makeup will be possible.