A non-calculus, one-semester course for preprofessional or non-engineering majors. Study of the basic concepts of physics, including the fundamental principles and theories in mechanics, energy, and waves.

PREREQUISITES
OR RECOMMENDED PREPARATION: MATH 140, concurrent registration or consent of instructor.

CO-REQUISITE: PHY 151

THIS COURSE IS (Required) FOR THE Arts and Science PROGRAM

PROVIDE DETAILS OF EXISTING OR DESIRED ARTICULATION (Date, college(s), purposes, pre-major or major, etc.): Spring 1985; UH Manoa; For students in the College of Arts and Sciences where it meets Natural Science core requirements and is also required for some degrees.

REASON FOR INITIATING, MODIFYING OR DELETING COURSE OR OTHER PERTINENT COMMENT:
Expanding the breadth of science course offerings at WCC will provide students opportunities to become more knowledgeable in areas closely related to high-technology development. The addition of a college physics course is also in accordance with the College's EDP. In addition, previous surveys at WCC have indicated a respectable level of student interest towards such a curriculum addition.
WCC CURRICULUM REVIEW FORM I
FORM FOR COURSE PROPOSALS

A. Information Needed for Processing ALL Course Proposals

Course Title: PHYS 151: College Physics I
Transfer: X Non-transfer
Submitted: David W. Shinn Date: 8/15/84

1. Course Objectives:
   At the end of the course the student is expected to be able to:
   1. demonstrate an understanding of the following topics and further,
      demonstrate the ability to analyze logically and mathematically problems
      in these fields (see class schedule for more specific areas):
      a. Laws of Newtonian Motion (stationary and non-stationary);
      b. momentum and energy and their conservation;
      c. simple oscillatory systems;
      d. energetic processes involving matter;
      e. gases and the gas laws, and;
      f. the basic principles of fluid mechanics;
   2. apply the developed physics concepts in abstract as well as real
      world situations, and;
   3. define quantitatively and qualitatively the common terms used in physics.

2. Provide details of additional staff, equipment facilities, library/media
   material and equipment, other financial support that would be required to
   implement the new course or the course modification.
   (REFER TO ATTACHED SHEETS)
   Has this additional cost been included in the budget for the proposed
   date of offering? Include in estimate of actual cost of supplies and
   equipment in addition to cost already budgeted by the discipline.
   a. Staff: This course will be part of the regular work load assignment
      for the new 1.0 position in Physics and Physical Sciences.
      Offering this course will not in itself necessitate the assignment
      of overload or the hiring of a lecturer.
   b. Equipment Facilities: The needs for equipment facilities can be met
      by the utilization of the existing lecture classroom in the Iolani Bldg.
   c. Library/media, computer, and equipment are already in place at WCC.
   d. Optional computer-assisted student tutorials may be carried out with
      the aid of existing computers at WCC and pre-programmed diskettes to be
      requisitioned as educational supplies, budgeted under PHYS 151L.
   e. Classroom demonstrations will be performed with low-cost demo models
      requisitioned as educational supplies as well as with equipment
      purchased for the co-proposed, co-requisite PHYS 151L laboratory course
      (See PHYS 151L proposal for detailed budget).
B. Information Needed to Process Course Modification Proposals ONLY

1. What change is proposed in the course? Provide specific information on both the new and the old course.
   
   N/A

2. Is the submitted change enough to require a change in course identification? If so, explain thoroughly.
   
   N/A

3. If the course is articulated with any four year program, give details and dates of agreements(s) and explain any impact the proposed change may have on articulation.
   
   N/A

4. Will this change alter the number of hours required to attain a certificate or degree? If so, provide details and justification.
   
   N/A
C. Information Needed to Process New Course Proposals

1. Course relation to EDP of the College:

This course relates to the college's goal of serving the needs of individuals who are seeking to meet baccalaureate program requirements for four-year colleges in Hawaii and in other locales.

2. Program course in (Please give some information concerning the status of the program and the relation of the course to the program):

In the College of Arts and Sciences at UH Manoa, this course meets a program requirement in a number of science related degree programs and also fulfills core requirements for non-science majors. At WCC, this course will meet the AA degree natural sciences core requirement.

3. Independent work by students:

Reading textbook, studying lecture notes, completing problem sets, and participating in optional learning activities such as weekly problem sessions and computer assisted instruction.

4. Rationale for articulation with UHM General Education Core--attach Windward Community College Form 3 for transfer course criteria, if appropriate:

This course is similar to PHYS 151: College Physics that is offered by the physics department at UH Manoa (also, see attached Form 3 for transfer criteria).

5. If similar to an upper division course, explain community college application:

N/A

6. If course is experimental and unique to Windward Community College, indicate additional rationale and impact on college curriculum, if appropriate:

N/A

D. Attach Course Outline for New Course Proposals or for Course Modifications that involve Changes in Content, Syllabus, or Time Schedule. Use the Windward Community College FORM 2: General Course Outline for Proposed Course. A student course outline may be submitted, if it indicates the syllabus, content, and time schedule of the proposed course. The student course outline submitted with this form provides this information.
Course: PHYS 151: College Physics I

Transfer X Nontransfer New X Modified

1. COURSE DESCRIPTION:
   A non-calculus, one semester course for preprofessional or non-engineering majors. Study of the basic concepts of physics, including the fundamental principles and theories in mechanics, energy, and waves.

2. HOURS PER WEEK: LEC 3 LAB OTHER TOTAL 3

3. PREREQUISITIES: MATH 140, concurrent registration, or consent of instructor

   COREQUISITIES: PHYS 151L

   RECOMMENDED PREPARATION: Knowledge of Analytic Geometry, Algebra, and Trigonometry.

4. SPECIFIC COURSE OBJECTIVES:
   See attached student course outline

   The reasons for requiring MATH 140 as a prerequisite or a concurrent course are:
   1. The subject matter in MATH 140 is needed by the students to achieve the objectives of this course;
   2. MATH 140 or the equivalent course is the prerequisite for this course at all other community colleges and by UHM. This course will also be considered for articulation with UHM, and;
   3. There is a sufficient pool of students enrolling in the pre-calculus and calculus courses at WCC from which at least minimum enrollment can be established for this course.

5. TEXTBOOK AND MATERIALS:
   See attached student course outline

6. REFERENCE MATERIAL SAMPLES:
   See attached student course outline

7. AUXILIARY MATERIALS:
   See attached student course outline
TRANSFER COURSE CRITERIA

Course PHYS 151: College Physics I

Submitted by David W. Shinn

1. RATE OF STUDENT PROGRESS:
Refer to lecture schedule for weekly topics, due dates of assigned readings, and examination dates.

2. BASIC SKILLS NEEDED:
13th grade reading level; knowledge of Analytic Geometry, Algebra, and Trigonometry

3. AMOUNT OF SKILLS AND INDEPENDENT WORK REQUIRED:
Must be able to read a college level physics textbook with understanding. Must be able to solve physics problems that require mathematical skills at the pre-calculus level (i.e., MATH 140 or equivalent).

4. REASONING REQUIRED:
Must be able to interpret physical information which relates to the basic theories and models of physics covered. Furthermore, must strategically apply such information to the qualitative and quantitative descriptions of the solutions to problems.

5. CONCEPTUAL COURSE LEVEL:
College level physics concepts applied in problem solving situations.

6. BACKGROUND KNOWLEDGE PREREQUISITE:
MATH 140, concurrent registration, or consent of instructor.

6.5 Co-requisite: PHYS 151L

7. MASTERY LEVEL EXPECTED:
Ability to achieve at a satisfactory level on assigned problems and on a series of examinations designed to test the student's utilization of the concepts covered.

8. COUNTERPART IN 4 YEAR CAMPUS:
PHYS 151: College Physics (UH Manoa)

9. COURSE USE IN MAINLAND ACCREDITED SYSTEMS:
This is a standard non-calculus college physics course taught at many 4-year colleges and universities.
WINDWARD COMMUNITY COLLEGE
OUTLINE OF COURSE OBJECTIVES

COURSE NAME: COLLEGE PHYSICS
COURSE ALPHA: PHYS 151
CREDIT HOURS: 03

CATALOG DESCRIPTION: A non-calculus, one semester course for pre-professional or non-engineering majors. Study of the basic concepts of physics, including the fundamental principles and theories in mechanics, energy, and waves.

REQUIREMENTS COURSE SATISFIES:
AT WCC: Meets AA degree natural sciences core requirement.
AT UH MANOA: May meet natural sciences requirement.

PREREQUISITES: MATH 140, concurrent registration, or consent of instructor
COREQUISITE: PHYS 151L

RECOMMENDED BASIC SKILLS LEVELS: Knowledge of Analytic Geometry, Algebra, and Trigonometry
READING LEVEL OF TEXT(S): 13th grade

ACTIVITIES REQUIRED AT OTHER THAN REGULARLY SCHEDULED CLASS TIMES: None

INSTRUCTOR: DAVID W. SHINN
OFFICE: Iolani 106
OFFICE HOURS: To be announced at the start of the course.
OFFICE PHONE: 235-7321
EFFECTIVE DATE: January 1985
A. Goals of the Course

1. To provide the student with a general as well as quantitative understanding of the basic concepts of classical physics dealing with matter, with special reference to the fields of mechanics, energy, and waves.

2. To introduce the student to the logical processes and mathematical methodology used in physics.

3. To enhance the student's understanding and appreciation of the interrelationships between physics and human activities.

B. Objectives of the Course

At the end of the course the student is expected to be able to:

1. demonstrate an understanding of the following topics and further, demonstrate the ability to analyze logically and mathematically problems in these fields (see class schedule for more specific areas):
   a. Laws of Newtonian Motion (stationary and non-stationary);
   b. momentum and energy and their conservation;
   c. simple oscillatory systems;
   d. energetic processes involving matter;
   e. gases and the gas laws, and;
   f. the basic principles of fluid mechanics;

2. apply the developed physics concepts in abstract as well as real-world situations, and;

3. define quantitatively and qualitatively the common terms used in physics.

C. Performance Criteria for the Course

1. Problem Sets: The student will demonstrate the ability to apply physics concepts covered in the lectures and assigned readings by submitting solutions to assigned problem sets. Once assigned, the due dates will be one week later and no late submissions will be accepted unless instructor's consent is obtained. Although these problem sets are to be primarily an individual effort, a couple of helpful suggestions are offered. Firstly, on an individual basis, the student is encouraged to discuss these problem sets with the instructor and peers. Secondly, in addition to the lectures, problem sessions (optional attendance) will be held when appropriate to discuss the assigned problems as well as other problems that may warrant further clarity. Minimum level of achievement for this criterion is 60%.

2. Mid-Term Examinations: The student will demonstrate an understanding of the concepts of physics by integrating information that is gathered from reading assignments, problem sets, and lectures on three closed book/notes mid-term examinations. These exams will, in general, cover four to five major topics presented throughout the course. They will be problem oriented and partial credit can be awarded for partial solutions. Minimum level of achievement for this criterion is 60%.
3. Final Examination: The student will demonstrate the ability to accumulate and apply the basic concepts of physics covered throughout the semester on a 2-hour final examination. This exam will be closed book/notes; however, a one page "cribsheet" will be allowed for each student during the examination. Minimum level of achievement for this criterion is 60%.

C. Method of Grading

1. The student must meet the minimum level of achievement of Criteria 1, 2, & 3 in order to receive a passing grade for the course. Failure to satisfy these minimum levels of achievement will result in a grade of "F".

2. The assignment of points to the different objectives will be as follows:

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Objective</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Problem Sets)</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>(Mid-term Exams)</td>
<td>300</td>
</tr>
<tr>
<td>3</td>
<td>(Final Exam)</td>
<td>200</td>
</tr>
</tbody>
</table>

3. Letter grades will be assigned as follows:

- **A**: average of 90-100% of total points; meets minimum level of achievement on Criteria 1, 2, & 3;
- **B**: average of 80-89% of total points; meets minimum level of achievement on Criteria 1, 2, & 3;
- **C**: average of 70-79% of total points; meets minimum level of achievement on Criteria 1, 2, & 3;
- **D**: average of 60-69% of total points; meets minimum level of achievement on Criteria 1, 2, & 3;
- **F**: average of 0-59% of total points; failure to meet minimum level of achievement on Criteria 1, 2, & 3;
- **Cr**: Achievement of Criteria 1, 2, & 3 at C level or higher. Written consent of the instructor is required.
- **NC**: No credit given; achievement of Criteria 1, 2, & 3 at less than C level under the Cr/NC option.
- **I**: Incomplete. This is a temporary grade given at the instructor's option when a student has failed to complete a small part of a course because of circumstances beyond his or her control. The student is expected to complete the course by the last day of instruction of the succeeding semester. If this is not done, the I will revert to the contingency grade identified by the instructor.
- **W**: Official withdrawal after the third week of a 16-week course and prior to the end of the 10th week of a 16-week course.
No re-examinations will be given. Make-up exams and waiver of the minimum levels of achievement will be given only in unique situations at the instructor's discretion. In the event of non-attendance, the student will not receive points for that problem set or examination. Testing is done on an honor system. Students involved in cheating systems will be dealt with in accordance with the WCC/UH guidelines concerned with academic dishonesty.

D. Textbook and Other Instructional Materials

   - A calculator with trigonometric functions.

2. Optional - Study Guide and Workbook for Physics, by Lois M. Kieffaber.

3. Reference Materials - Other introductory physics texts and handouts on reserve in the open lab, library, or provided by the instructor.

E. Mode of Instruction

The lecture/demonstration mode of instruction will be very important in this course. However, the lectures will be designed to supplement, rather than substitute for, the material in the text. Whenever possible, self-paced instructional material will be made available to the student. Weekly problem solving sessions will be appropriately scheduled as well as, in the case of specific student needs, other tutorial sessions.
**PHYS 151 CLASS SCHEDULE**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE TOPICS</th>
<th>READING ASSIGNMENT</th>
<th>EXAM DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan. 11-18</td>
<td>Units; Scalars, and Vectors; Vector Representation and Operations; Statics; Conditions of Equilibrium; Torques</td>
<td>1.1 - 1.8; 2.1 - 2.5</td>
</tr>
<tr>
<td>2</td>
<td>Jan. 21-25</td>
<td>Kinematics: Speed, Velocity, and Acceleration (Average, Instantaneous, and Constant)</td>
<td>3.1 - 3.6</td>
</tr>
<tr>
<td>3</td>
<td>Jan. 28-Feb. 1</td>
<td>Gravitational Acceleration; Projectile Motion; Newton's Laws of Motion</td>
<td>3.7 - 3.8; 4.1 - 4.5</td>
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<tr>
<td>4</td>
<td>Feb. 4-8</td>
<td>Problem Solving Techniques in Motion Analysis; Friction Forces; Momentum and its Conservation</td>
<td>4.6 - 4.7; 5.1 - 5.4</td>
</tr>
<tr>
<td>5</td>
<td>Feb. 11-15</td>
<td>Circular Motion at Constant Speed; Centripetal Accelerations and Displacement; Tangential Quantities</td>
<td>6.1 - 6.7</td>
</tr>
<tr>
<td>6</td>
<td>Feb. 18-22</td>
<td>Associated Systems Dealing with Circular Motion; Newton's Law of Gravitation</td>
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<tr>
<td>7</td>
<td>Feb. 25-Mar. 1</td>
<td>Angular and Tangential Acceleration; Torque and Angular Acceleration; Moment of Inertia; Angular Momentum and its Conservation</td>
<td>7.1 - 7.7</td>
</tr>
<tr>
<td>8</td>
<td>Mar. 4-8</td>
<td>Work, Power, Work-Power Calculations; Types of Energy and its Conservation, Work-Energy Calculations; Collisional Processes</td>
<td>8.1 - 8.10</td>
</tr>
<tr>
<td>9</td>
<td>Mar. 11-15</td>
<td>Vibratory Motion; Energy and Frequency of Simple Harmonic Oscillators (SHO): Pendulum; Kinematics of SHO: Damping Effects</td>
<td>16.1 - 16.7</td>
</tr>
<tr>
<td>10</td>
<td>Mar. 18-22</td>
<td>Traveling Waves and Their Physical Description; Wave Reflection, Transmission, and Superposition; Doppler Effect</td>
<td>17.1 - 17.8</td>
</tr>
<tr>
<td>11</td>
<td>Apr. 1-5</td>
<td>Standing Waves on Strings and Air Columns; Pitch, Quality, and Intensity of Sound</td>
<td>18.1 - 18.6</td>
</tr>
<tr>
<td>12</td>
<td>Apr. 8-12</td>
<td>Thermal Energy, Temperature, and Heat; Thermal Processes; Heat Transfer by Conduction and Convection</td>
<td>9.1 - 9.8; 10.1 - 10.2</td>
</tr>
<tr>
<td>13</td>
<td>Apr. 15-19</td>
<td>Heat Transfer by Radiation and Evaporation; Laws of Thermodynamics; Entropy; Heat Engines, Pumps and Refrigerators</td>
<td>10.3 - 10.5; 11.1 - 11.8</td>
</tr>
<tr>
<td>14</td>
<td>Apr. 22-26</td>
<td>Characteristics of Gases; Equations of State; Ideal Gas Law; Kinetic Theory of Gases</td>
<td>12.1 - 12.6</td>
</tr>
<tr>
<td>15</td>
<td>Apr. 29-May 6</td>
<td>Work-Energy Equation for Gases; Pressure and Density of Fluids; Pressure Variation with Depth; Pascal's and Archimedes Principles; Fluid Flow; Equation of Continuity; Bernoulli's Equation, Semester Review</td>
<td>12.7; 13.1 - 13.5; 14.1 - 14.4</td>
</tr>
<tr>
<td>16</td>
<td>Date to be determined</td>
<td>Final Exam</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Assignments are to be read prior to discussion in lecture. Bring texts, notebooks, and handouts to each class session.