

WASHTENAW COMMUNITY COLLEGE
COURSE-SYLLABUS APPROVAL FORM (CSAF)

PHY 059

For help screens, select a field and press F1

SECTION I. COURSE SUBMISSION INFORMATION

1. Course: (Enter proposed discipline, number & title here. If changing the number or title of an existing course, give old number or title in box 4 below.)
Discipline/No: PHY 059 Title: Fundamentals of Physics

Division Code: MNS Department Code: PHY Effective Term: W'00 ☐ Do not publish in Time Schedule
☐ Do not publish in College Catalog

2. Type of Approval: (applies to both new courses and changes)
☒ Full Approval
☐ Conditional Approval
☐ This proposal previously received conditional approval for the Term: _____

3. Reason for Submission: This Course is being submitted for: (check all that apply)
☐ New Course Approval (Skip the rest of Section I and go directly to Section II.)
☒ Five-year Syllabus Review ☐ No changes to course
☐ Major Change(s)
☒ Minor Change(s) (If not due for review, submit sections I, II, and revised parts of Section III.)
☐ Reactivation of Inactive Course
☐ Inactivation (Submit Sections I and II only.)

4. Change Information: (Check all that apply. Make proposed changes in Section III, Course Syllabus.)
Minor Changes
☐ Course Discipline/Number (was _____)
☐ Course Title (was _____)
☒ Course Description
☐ Capacity (was: _____)
☐ Pre or Corequisites
☒ Course Objectives
☐ Distribution of Contact Hours (contact hours were: lect: _____ lab: _____ clin: _____ exp: _____)
☐ Distance Learning - minor (Attach Preliminary Approval Form for Distance Learning & the Section Handout.)
☐ Other _____
Major Changes (Major changes will be reviewed by Curriculum Committee.)
☐ Credit hours (credits were: _____)
☐ Core Elements: (Elements to be added: _____
(Elements to be removed: _____)
☐ Grading
☐ Course Objectives affecting core elements
☐ Total Contact Hours (total contact hours were: _____)
☐ Honors (Attach Honors Section Approval Form.)
☐ Distance Learning - major (Attach Preliminary Approval Form for Distance Learning & the Student Handout for the Distance Section.)
☐ Other _____

5. Rationale for changes:
Description and objectives revised to clarify course intent.

SECTION II. COURSE REVIEW INFORMATION AND SIGNATURES

1. Department Review (To be completed by department chair; if recommendation is no, initial and return to preparer with rationale attached.)
Will significant new resources be required? ☐ yes ☒ no (If yes, explain _____)
Have departments that may be affected by this course been consulted? ☐ yes ☐ no (Explain NA _____)
Does the department support approval of this course? ☒ yes ☐ no
Print: D. HINDS Signature: [Signature] Date: 4/10/2000
Faculty/Preparer
Print: K. BUTCHER Signature: [Signature] Date: 4/1/2000
Department Chair

2. Division Review (To be completed by division dean; if recommendation is no, initial and return with rationale attached.)
Will significant new resources be required? ☐ yes ☒ no (If yes, have they been secured? ☐ yes ☐ no)
Is this a curricular priority for your division? ☒ yes ☐ no (Comment _____)
What is your estimate of projected enrollment? 40 - 80
Recommendation ☒ Yes ☐ No
Division Dean's Signature: [Signature] Date: 4/4/00

3. Curriculum Committee Review (Attach additional comments if necessary.)
Recommendation ☐ Yes ☐ No
Curriculum Committee Chair's Signature: _____ Date: _____

4. Vice President for Instruction and Student Services Approval (Attach additional comments if necessary.)
Approval ☒ Yes ☐ No
Vice President's Signature: [Signature] Date: 5/2

Log File: 5/11/00 ACS Code: 151 Catalog File Date: 5/3/00 Access Date: 5/3/00
Core Elements Approved: NA New Syllabus Date: 4/10/00

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MAY 19 2000

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SECTION III. COURSE SYLLABUS

For help screens, select a field and press F1.

A. COURSE DETAILS (discipline # and title will automatically be entered in 1 and 2 below upon saving or previewing)

1. Course Discipline & No.: <u>PHY 059</u>		2. Course Title: <u>Fundamentals of Physics</u>	
3. Course Description: This is a course for students with no previous physics background. The emphasis is on acquiring the basic conceptual understanding necessary to succeed in later courses. The course is recommended for those students wishing to improve their physics background before taking 100 level physics courses, or students desiring an exposure to physics. Physics topics focus on mechanics and include: motion, force, momentum, energy, rotation, and gravity.			
4. Credit Hours: <u>3</u> If Variable credit, Give Range: _____ to _____ If repeatable for credit, how many times? _____		5. Class Capacity: <u>24</u> (If nonstandard, attach Class Capacity Exception form.)	
		6. Course Options: ☐ Distance learning (Attach preliminary distance approval form and Section Handout.) ☐ Honors (Complete Part G.) ☐ P/NP Grading (Attach rationale.)	
7. Contact Hours per Semester in: Lecture: <u>45</u> Lab: _____ Clinical: _____ Experiential: _____ Total Contact Hrs: <u>45</u>		8. Prerequisite(s): <u>none</u> _____ _____	
		9. Corequisite(s): (limit to 2) _____ _____	
10. a. Course Purpose: ☐ Program Specialty ☐ Program Support ☐ Nonprogram Specialty ☐ Transfer ☒ Enrichment ☒ Basic Skills		b. Is this course a requirement for a program? ☐ Yes (specify the program(s) below) _____ _____ ☒ No	
		c. Indicate schools to which you want Curriculum Services to send syllabus: (If transfer is approved, attach documentation.) ☐ EMU ☐ UM ☐ Other _____	

B. MAJOR INSTRUCTIONAL UNITS A major instructional unit is a grouping of topics that naturally relate to one another. List in order the major instructional units. Add additional numbers as needed.

1. Linear and Nonlinear Motion
2. Newton's Laws of Motion
3. Momentum
4. Energy
5. Rotational Motion
6. Gravity
- 7.
- 8.
- 9.
- 10.

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C. CORE ELEMENT INFORMATION**1. Core Element Submission Information:** (Please check all that apply)

- ☐ This course has been previously approved for core elements. List **currently** approved core elements: _____
- ☐ Please review this course for core elements marked in part 2 below. (Mark only core elements being added or those needing review because of proposed major changes to the course.)
- ☒ This course does not meet any core elements. Explain (Pre-college level) _____

2. Proposed Core Element(s): (Mark the boxes of only the elements to be reviewed at this time. For detailed information on the criteria for determining whether a course meets a core element, refer to the Core Element Annotations in the Curriculum Manual.)

- | | |
|---|--|
| ☐ 1. To read and listen in a critical and perceptive way; to speak in an organized, clear, and effective manner. | ☐ 14. To be aware of the nature and variety of the human experience through the methods and applications of the humanities |
| ☐ 2. To use information sources and information gathering techniques; to cite sources when producing written communications. | ☐ 15. To understand the basic principles of scientific inquiry. |
| ☐ 3. To develop, organize, and express thoughts in writing using Standard English. | ☐ 16. To have a knowledge of basic human biological principles, including those related to wellness. |
| ☐ 4. To apply basic mathematics through the level of elementary algebra. | ☐ 17. To understand the basic principles of the natural sciences, and their relationship to the environment. |
| ☐ 5. To represent and solve problems using mathematical techniques. | ☐ 18. To understand the basic principles and applications of technology. |
| ☐ 6. To interpret elementary descriptive statistics. | ☐ 19. To understand the principle of integrating technological elements into systems. |
| ☐ 7. To comprehend and use concepts and ideas. | ☐ 20. To understand the relationship of technology to individuals, society, and the environment. |
| ☐ 8. To develop, express, test, and evaluate ideas. | ☐ 21. To understand the methods and applications of the social sciences in exploring the dynamics of human behavior. |
| ☐ 9. To analyze problems, develop solutions, and evaluate results in a clear, logical, and consistent manner. | ☐ 22. To understand those principles and values, including individual rights and civic responsibilities, which maintain and enhance democracy and freedom in a pluralistic society. |
| ☐ 10. To distinguish between fact and opinion; to recognize biases and fallacies in reasoning. | ☐ 23. To have a working knowledge of the history, structure, and function of American social, political, and economic institutions. |
| ☐ 11. To use computer systems to achieve professional, educational, and personal objectives. | ☐ 24. To be aware of the contemporary global community, especially its geographical, cultural, economic, and historical dimensions. |
| ☐ 12. To apply the protocols of computer use and respect the legal and other rights of individuals or organizations. | |
| ☐ 13. To be aware of the artistic experience in personal and cultural enrichment, growth, and communication. | |

DIRECTIONS: Each core element marked above must be included in the appropriate core element boxes next to the course objectives in SECTION D which directly support that core element.

3. Courses That Partially Satisfy A Core Element In Combination With Other Courses:

- ☐ If this course is part of a combination of courses that together meet a core element, mark this box. The courses must all be submitted and reviewed together for core element approval.

Other course(s) required _____

Dean's Comments:

Curriculum Committee's Comments:

Vice President's Comments:

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D. INSTRUCTIONAL OBJECTIVES AND CORE ELEMENTS SUPPORTED

DIRECTIONS: (These Units should match those listed in Section B.) Use student outcome based language. (Example: The student will develop and support a thesis in an essay.) If the objective is being used to directly support a core element, write the core element number in the box to the right. If needed, additional information on how the core element is to be met and/or assessed for accomplishment can be included under the objective. If desired you may add a section of "overall course objectives" which are not associated with a specific unit. This may be particularly helpful for addressing core elements.

Unit Objectives

Core Elements

Unit #1 Linear and Nonlinear Motion.

The student will

- | | |
|---|---|
| # 1 study the concept of Aristotle's world view compared to atomists. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 2 study the concept of how Aristotle's physics confirms his world view and is incompatible with the world view of the atomists. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 3 study the concept of similarity between our modern world view and that of the atomists. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 4 study the problems in Aristotle's physics and Galileo's solution. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 5 study the concept of velocity and acceleration. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 6 do problem solving involving inclined planes and free fall. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 7 study the concept of projectile motion, problems Aristotle had, and solutions by Galileo. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 8 study the concept of satellite motion. | <input style="width: 60px; height: 20px;" type="text"/> |

Unit #2 Newton's Laws of Motion

The student will

- | | |
|---|---|
| # 1 study the concepts of mass and weight. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 2 study the concept of acceleration proportional to force and inversely proportional to mass. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 3 do problem solving involving mass, weight, and force. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 4 study the concept of non free fall, air resistance, and terminal velocity. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 5 study the concept of why terminal velocity is dependent on size. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 6 study the concept of surface area to weight ratios for different size bodies and the relationship to terminal velocity. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 7 study the concept of Newton's third law. | <input style="width: 60px; height: 20px;" type="text"/> |
| # 8 study the concept of Newton's second law. | <input style="width: 60px; height: 20px;" type="text"/> |

Unit #3 Momentum

The student will

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- # 1 study the concept of momentum.
- # 2 study the concept of conservation of momentum.
- # 3 study the concept of collisions, elastic and inelastic.
- # 4 do problem solving in collisions using momentum.

Unit #4 Energy

The student will

- # 1 study the concepts of energy and power.
- # 2 study the concepts of potential energy and kinetic energy.
- # 3 study the concept of conservation of energy.
- # 4 do problem solving using conservation of energy.
- # 5 study the concept of energy and simple machines (pulleys).
- # 6 study the differences between momentum and energy.
- # 7 study the concept of using conservation of energy and conservation of momentum together.

Unit #5 Rotational Motion

The student will

- # 1 study the concept of rotational inertia compared to mass.
- # 2 study the concept of torque compared to force.
- # 3 study the analogy to Newton's second law in rotational motion.
- # 4 study the concept of center of mass.
- # 5 study the concepts of centripetal and centrifugal force.
- # 6 study the concept of centripetal acceleration.
- # 7 study the concept of simulated gravity in space stations.
- # 8 study the concept of conservation of angular momentum.

Unit #6 Gravity

The student will

- # 1 study the concept of Kepler's laws and the notion of empirical versus theoretical laws.
- # 2 study the concept of Newton's law of gravitation.
- # 3 study the concept of inverse square proportionality compared to other possibilities.

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- | | | |
|-----|---|----------------------|
| # 4 | study the concept of apparent weight versus real weight. | <input type="text"/> |
| # 5 | study the concept of "weightlessness." | <input type="text"/> |
| # 6 | study the concept of tides. | <input type="text"/> |
| # 7 | study the concept of gravitational field inside a planet compared to gravitational field on a shrinking planet. | <input type="text"/> |
| # 8 | study the concept of black holes. | <input type="text"/> |
| # 9 | do problem solving using Newton's law of gravitation. | <input type="text"/> |

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E. INSTRUCTIONAL METHODS AND EVALUATION

1. Instructional Methods: (Check the appropriate boxes and describe as needed.)

- | | |
|--|---|
| ☒ Lecture/Discussion _____ | ☐ Field Trips _____ |
| ☐ Clinical Instruction _____ | ☐ Team Assignments _____ |
| ☐ Self-Paced Learning _____ | ☐ Telecourse _____ |
| ☐ Internet Instruction _____ | ☐ Video Seminar _____ |
| ☐ Computer Simulations _____ | ☐ Laboratory Assignments _____ |
| ☐ On-Site Work Experience _____ | ☐ Interactive TV _____ |
| ☐ Other _____ | |

2. Evaluation Criteria:

- | | |
|---|--|
| ☒ Attendance _____ | ☒ Quizzes _____ |
| ☐ Class Discussion _____ | ☒ Tests _____ |
| ☐ Papers _____ | ☐ Midterm _____ |
| ☐ Portfolio _____ | ☒ Final Exam _____ |
| ☐ Projects _____ | ☒ Home Work _____ |
| ☒ Reports _____ | ☐ Presentations _____ |
| ☐ Clinical/Work _____ | ☐ Performances _____ |
| ☒ Other (as determined by instructor) _____ | |

3. Attendance Requirements: (For Certification or nonevaluative purposes.)

F. EQUIPMENT, FACILITIES, TEXTS, MATERIALS, AND SUPPLIES

1. Special Equipment/Facilities : (Check the appropriate boxes and describe as needed.)

- | | |
|--|--|
| ☐ Lab equipment _____ | ☐ Testing Center _____ |
| ☐ LRC Reserves _____ | ☐ Student Competitions _____ |
| ☐ Computers _____ | ☐ Off-Campus Sites _____ |
| ☐ CD ROM _____ | ☐ Student Tutors _____ |
| ☐ Field Trips _____ | ☐ Distance Learning Classroom _____ |
| ☐ Other _____ | |

2. Texts: (Please indicate if no text is required.)

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- 9. Rotation
- 10. Center of Gravity
- 11. Gravity I
- 12. Atoms

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Title: Conceptual Physics
 Author: Hewitt Copyright Yr: 8e (1998)
 Publisher: Addison-Wesley Est. Cost: \$75
 or latest

Title: _____
 Author: _____ Copyright Yr: _____
 Publisher: _____ Est. Cost: _____

Title: _____
 Author: _____ Copyright Yr: _____
 Publisher: _____ Est. Cost: _____

Title: _____
 Author: _____ Copyright Yr: _____
 Publisher: _____ Est. Cost: _____

Title: _____
 Author: _____ Copyright Yr: _____
 Publisher: _____ Est. Cost: _____

Other Texts: _____

3. Supplies and/or Uniforms Student will have to Own or Acquire for Course:

(e.g. calculators, uniforms, tools, and software, etc., excluding pen, pencil, paper, or textbooks.)

Descriptions	Cost Estimates
scientific calculator	varied-- see instructor
graph paper	\$4

4. Reference Materials Students Will Use:

(e.g. journals, books, manuals, maps, LRC reserves, etc.)

5. Audio/Visual and Computer Materials Students Will Use:

(e.g. films, video tapes, slides, audio tapes, software, CDs, etc.)

Title	Source
Hewitt films, Conceptual Physics Alive Series:	Addison-Wesley
1. Scaling	
2. Linear Motion	
3. Vectors and Projectiles	
4. Newton's 1st Law	
5. Newton's 2nd Law	
6. Newton's 3rd Law	
7. Momentum	
8. Energy	

Prereq Changes

Done
11/17/02

All Level I

Physics

PHY

PHY 059: Fundamentals of Physics 3 Credits

Prerequisites: College Level Entry Scores

Corequisites: None

45 lecture, 0 lab, 0 clinical, 0 other, 45 total contact hours

Fulfills Core Elements: None

This is a course for students with no previous physics background. The emphasis is on acquiring the basic conceptual understanding necessary to succeed in later courses. The course is recommended for those students wishing to improve their physics background before taking 100 level physics courses, or students desiring an exposure to physics. Physics topics focus on mechanics and include motion, force, momentum, energy, rotation, and gravity.

PHY 105: Conceptual Physics 4 Credits

Prerequisites: MTH 090 or COMPASS Prealgebra = 24

Corequisites: None

45 lecture, 45 lab, 0 clinical, 0 other, 90 total contact hours

Fulfills Core Elements: 5 7 9 15 17 18

Designed for both transfer and vocational students with no physics experience, but desiring a working knowledge of physics, PHY 105 surveys the major topics of motion, heat, waves, electricity, magnetism, light, and atomic energy using a conceptual approach with a minimum of mathematics.

PHY 110: Applied Physics 4 Credits

Prerequisites: MTH 090 or COMPASS Prealgebra = 24

Corequisites: None

45 lecture, 45 lab, 0 clinical, 0 other, 90 total contact hours

Fulfills Core Elements: 4 5 7 9 15 18

Technical-Vocational students with no previous experience with physics should take this course to fulfill their program requirements. Topics covered are: properties of matter, motion, force, energy, machines, fluids, and heat. Laboratory exercises give students an opportunity to test theoretical principles.

PHY 111: General Physics I 4 Credits

Prerequisites: MTH 169 or COMPASS Algebra = 46

Corequisites: None

45 lecture, 45 lab, 0 clinical, 0 other, 90 total contact hours

Fulfills Core Elements: 4 5 7 9 11 15 18

The topics of mechanics, wave motion and heat are presented to pre-professional and liberal arts students using algebra and trigonometry. Open Physics Laboratory exercises supplement students' understanding of the topics covered. PHY 111 usually represents the first part of a two-semester sequence in algebra-based physics required by many programs.

PHY 122: General Physics II 4 Credits

✓ Prerequisites: PHY 111 - *C. Corbatter*

Corequisites: None

45 lecture, 45 lab, 0 clinical, 0 other, 90 total contact hours

Fulfills Core Elements: 4 5 7 9 11 15 18

As the second part of a two-semester sequence in algebra-based physics, PHY 122 includes the topics of electricity, magnetism, light, and atomic physics. Open Physics Laboratory exercises are included to assist students' understanding of these topics.

PHY 211: Analytical Physics I 5 Credits

✓ Prerequisites: (MTH 191 or COMPASS Trigonometry = 46)

and (PHY 105 or PHY 111) or *H.S. Physics*

Corequisites: None

60 lecture, 45 lab, 0 clinical, 0 other, 105 total contact hours

Fulfills Core Elements: 4 5 7 9 15 17

The first of a two-course sequence in calculus-based physics for students intending to major in science or engineering, PHY 211 develops the concepts of mechanics, heat, and wave motion. Laboratory exercises are included to assist students' understanding of these topics.

PHY 222: Analytical Physics II 5 Credits

✓ Prerequisites: PHY 211 - *C. Corbatter*

Corequisites: None

60 lecture, 45 lab, 0 clinical, 0 other, 105 total contact hours

Fulfills Core Elements: 5 7 9 15 18

This second part of a two-course sequence in calculus-based physics covers the concepts of electromagnetism, light, and modern physics extending the student's knowledge of physics learned in PHY 211.

Political Science

PLS

PLS 112: Introduction to American Government 3 Credits

Prerequisites: College Level Entrance Scores

Corequisites: None

45 lecture, 0 lab, 0 clinical, 0 other, 45 total contact hours

Fulfills Core Elements: 1 2 7 8 9 10 21 22 23 24

This class studies the forms and functions of American government with emphasis on national government. The decision-making process in Congress, the Presidency and the federal court system are studied. The course also examines the relationship of political parties and public opinion to the electoral process. This course is also taught as a television course.

Approved by
M. Showalter
per phone call
11/18/02