

1. Curriculum Action

- New Course Course Modification Five Year Review

2. Proposer

3. Department

- Allied Health Business & Hospitality Career & Tech Education
 English Humanities Social Science
 Science/Tech/Eng/Math

4. Course Alpha

5. Course Number

6. Course Title

7. If this is a course modification or a five year review, please check the curriculum items being modified.

- | | | |
|--|--|---|
| <input type="checkbox"/> 1. Course Alpha | <input type="checkbox"/> 2. Course Number | <input type="checkbox"/> 3. Course Title |
| <input type="checkbox"/> 4. Credits | <input type="checkbox"/> 5. Contact Hours | <input type="checkbox"/> 6. Course Description |
| <input type="checkbox"/> 7. Prerequisites | <input type="checkbox"/> 8. Corequisites | <input type="checkbox"/> 9. Rec Prep |
| <input type="checkbox"/> 10. Cross-list w other course | <input type="checkbox"/> 13. Grading Method | <input type="checkbox"/> 14. Repeatable for credit? |
| <input type="checkbox"/> 15. SLOs | <input type="checkbox"/> 16. Course Competencies | <input type="checkbox"/> 17. Content & Timeline |
| <input type="checkbox"/> 18. PLOs | <input type="checkbox"/> 19. CASLOs | <input type="checkbox"/> 21. Method of Delivery |
| <input type="checkbox"/> 22. Text and Materials | <input type="checkbox"/> 23. Maximum Enrollment | <input type="checkbox"/> 29. Course Designation |
| <input type="checkbox"/> 31. Catalog Modification | | |
| <input type="checkbox"/> Other <input type="text"/> | | |

8. Proposed Semester

9. Effective Semester (1 Year from Proposed Semester)

University of Hawaii Maui College
PHYS 101 - Technical Automotive Physics

1. Course Alpha.

PHYS

2. Course Number.

101

3. Course Title/Catalog Title.

Technical Automotive Physics

4. Number of Credits.

3

5. Contact Hours/Type.

- Hour lecture (3)

6. Course Description.

Introduces Newton's laws of motion, physical work and energy, fluids, heat, electric circuits, and transformers with emphasis on practical applications and laboratory exercises involving the principles of physics as related to automotive and mechanical trades.

7. Pre-Requisites.

QM 107 with grade C or better, or consent.

8. Co-requisites.

9. Recommended Preparation.

None

10. Is this a cross-listed course?

NO

11. Reason for Proposal. Why is this course being proposed or modified? This question requires specific information as part of the explanation.

PHYS 101 is a new course proposed to replace the existing physics course PHYS 50 in the Automotive Program/Curriculum at University of Hawaii Maui College (UHMC).

Two motivations for creating this new course are:

1. The course introduces quantitative issues and theories involved in the practical applications of physics that students encounter in general and vocational requirements to obtain an Automotive Program AAS at UHMC.
2. The general education classes need to be moved/revised to 100+ level to satisfy UHCC accreditation policy.

12. Effective Semester and Year.

Fall 2016

13. Grading Method. What grading methods may be used for this course?

- Standard (Letter,Cr/NCr,Audit) (0)

14. Is this course repeatable for credit? How often can this course be counted toward a degree or certificate?

NO

15. Course Student Learning Outcomes (SLOs).

Course SLO/Competency	demonstrate the ability to use measurement techniques;	explain time dependence of the motion and collision problems;	demonstrate the ability to use concept of work and energy transfer;	explain heat engine and second law of thermodynamics;	identify the basic electrical circuits and their use in the automotive systems;	demonstrate the ability to use Ohm's law and Watt's law;	explain the interaction of electricity and magnetism in transformer;	obtain, evaluate, and communicate results of the lab experiment;
apply the principles of physics in the automotive field;	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
demonstrate the ability to use appropriate mathematical method to explain physics principles to the problems;	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
demonstrate knowledge of the mathematical techniques and computational thinking in the automotive fields;	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
demonstrate quantitative reasoning power by carrying out lab experiments, working in groups, and report in written language the results of the experiment.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

PSLO/ Course SLO	apply the principles of physics in the automotive field;	demonstrate the ability to use appropriate mathematical method to explain physics principles to the problems;	demonstrate knowledge of the mathematical techniques and computational thinking in the automotive fields;	demonstrate quantitative reasoning power by carrying out lab experiments, working in groups, and report in written language the results of the experiment.
Diagnose, service, and repair the modern internal combustion engine;	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Diagnose, service, and repair the brake system;	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Diagnose, service, and repair the automatic transmission and transaxle;				
Diagnose, service, and repair the power train system;				
Diagnose, service, and repair the electrical system;	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Diagnose, service, and repair the fuel system;	<input checked="" type="checkbox"/>			
Diagnose, service, and repair the	<input checked="" type="checkbox"/>			

emission system;				
Diagnose, service, and repair the ignition system;	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Diagnose, service, and repair the heating and air conditioning system;	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Diagnose, service, and repair the steering and suspension system;	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
To be able to write customer repair orders and estimates;				
To be able to communicate orally, to customers, management, parts person and other technicians;				
To be able to use a computer to retrieve information for repairs and estimates;			<input checked="" type="checkbox"/>	
Write resumes and be able to use job interview techniques;				

16. Course Competencies.

Competency
demonstrate the ability to use measurement techniques;
explain time dependence of the motion and collision problems;
demonstrate the ability to use concept of work and energy transfer;
explain heat engine and second law of thermodynamics;
identify the basic electrical circuits and their use in the automotive systems;
demonstrate the ability to use Ohm's law and Watt's law;
explain the interaction of electricity and magnetism in transformer;
obtain, evaluate, and communicate results of the lab experiment;

17. Recommended Course Content and Timeline.

Content
TOPIC 1: MECHANICS (5 weeks)
Physical quantities and units of measure;
One dimensional movement - kinematic equations using active learning approach to solve motion problems;
Newton's laws of motion; Seat belt physics and collision theory;
Rolling, lifting, and force multipliers; the automobile - a rolling example of physics at work;
Physical work and energy transfer;
TOPIC 2: PROPERTIES OF MATTER (2 weeks)
Pascal's law and Hydraulic brakes; Fluid motion using continuity equation;
TOPIC 3: THERMODYNAMICS (3 weeks)
Temperature, heat and expansion methods;
Heat engine and Laws of thermodynamics;
TOPIC 4: ELECTRICITY AND MAGNETISM (6 weeks)
Electric Charge and Energy;
Interaction of Electricity and Magnetism;
Voltage, current, resistance, and condenser in electric circuit; Ohm's law and Watt's law;
Power and energy of electric current;
Electric motor and generator; Transformer;
DC and AC; Analysing Sine waves;

18. Program Learning Outcomes.

Program SLO
Diagnose, service, and repair the modern internal combustion engine;
Diagnose, service, and repair the brake system;

Diagnose, service, and repair the automatic transmission and transaxle;
Diagnose, service, and repair the power train system;
Diagnose, service, and repair the electrical system;
Diagnose, service, and repair the fuel system;
Diagnose, service, and repair the emission system;
Diagnose, service, and repair the ignition system;
Diagnose, service, and repair the heating and air conditioning system;
Diagnose, service, and repair the steering and suspension system;
To be able to write customer repair orders and estimates;
To be able to communicate orally, to customers, management, parts person and other technicians;
To be able to use a computer to retrieve information for repairs and estimates;
Write resumes and be able to use job interview techniques;

19. College-wide Academic Student Learning Outcomes (CASLOs).

Creativity - Able to express originality through a variety of forms.
<input checked="" type="checkbox"/> Critical Thinking - Apply critical thinking skills to effectively address the challenges and solve problems. <input checked="" type="checkbox"/> Level I
Information Retrieval and Technology - Access, evaluate, and utilize information effectively, ethically, and responsibly.
Oral Communication - Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.
<input checked="" type="checkbox"/> Quantitative Reasoning - Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately. <input checked="" type="checkbox"/> Level I
Written Communication - Write effectively to convey ideas that meet the needs of specific audiences and purposes.

20. Linking.

21. Method(s) of delivery appropriate for this course.

Lecture and classroom demonstration.

22. Text and Materials, Reference Materials, and Auxiliary Materials.

Appropriate text book, laboratory manual, and multimedia will be chosen at the time the course is offered. A reference text from those currently available in the department is:

- Vern J. Ostdiek and Donald J. Bord. Inquiry into Physics. 7th. Cengage, 2013, 1-133-10468-1.

23. Maximum enrollment.

24

24. Particular room type requirement. Is this course restricted to particular room type?

NO

25. Special scheduling considerations. Are there special scheduling considerations for this course?

NO

26. Are special or additional resources needed for this course?

The instructor may need to collect equipment/materials from Physics Lab, Ike Lea Room 112

27. Does this course require special fees to be paid for by students?

NO

28. Does this course change the number of required credit hours in a degree or certificate?

NO

29. Course designation(s) for the Liberal Arts A.A. degree and/or for the college's other associate degrees.

Degree	Program	Category
Associate in Arts:	Liberal Arts	LE - Elective
AS:	NONE	
AAS:	Automotive Technology	NS - Natural Science
BAS:	N/A	
Developmental/Remedial:	N/A	

30. Course designation(s) for other colleges in the UH system.

N/A

31. Indicate the year and page # of UHMC catalog referred to. For new or modified courses, please indicate the catalog pages that need to be modified and provide a sheet outlining those changes.

Catalog 2015-2016, Page 30(x 2), 31(x 2), 35, 37, 38, 44(x 2), 46, 47, 49(x 2), 53, 137

32. College-wide Academic Student Learner Outcomes (CASLOs).

Standard 1 - Written Communication Write effectively to convey ideas that meet the needs of specific audiences and purposes.	
Outcome 1.1 - Use writing to discover and articulate ideas.	1
Outcome 1.2 - Identify and analyze the audience and purpose for any intended communication.	0
Outcome 1.3 - Choose language, style, and organization appropriate to particular purposes and audiences.	1
Outcome 1.4 - Gather information and document sources appropriately.	2
Outcome 1.5 - Express a main idea as a thesis, hypothesis, or other appropriate statement.	1
Outcome 1.6 - Develop a main idea clearly and concisely with appropriate content.	0
Outcome 1.7 - Demonstrate a mastery of the conventions of writing, including grammar, spelling, and mechanics.	0
Outcome 1.8 - Demonstrate proficiency in revision and editing.	0
Outcome 1.9 - Develop a personal voice in written communication.	1
Standard 2 - Quantitative Reasoning Synthesize and articulate information using appropriate mathematical methods to solve problems of quantitative reasoning accurately and appropriately.	
Outcome 2.1 - Apply numeric, graphic, and symbolic skills and other forms of quantitative reasoning accurately and appropriately.	3
Outcome 2.2 - Demonstrate mastery of mathematical concepts, skills, and applications, using technology when appropriate.	2
Outcome 2.3 - Communicate clearly and concisely the methods and results of quantitative problem solving.	3
Outcome 2.4 - Formulate and test hypotheses using numerical experimentation.	2

Outcome 2.5 - Define quantitative issues and problems, gather relevant information, analyze that information, and present results.	3
Outcome 2.6 - Assess the validity of statistical conclusions.	1
Standard 3 - Information Retrieval and Technology. Access, evaluate, and utilize information effectively, ethically, and responsibly.	
Outcome 3.1 - Use print and electronic information technology ethically and responsibly.	1
Outcome 3.2 - Demonstrate knowledge of basic vocabulary, concepts, and operations of information retrieval and technology.	1
Outcome 3.3 - Recognize, identify, and define an information need.	2
Outcome 3.4 - Access and retrieve information through print and electronic media, evaluating the accuracy and authenticity of that information.	0
Outcome 3.5 - Create, manage, organize, and communicate information through electronic media.	1
Outcome 3.6 - Recognize changing technologies and make informed choices about their appropriateness and use.	0
Standard 4 - Oral Communication Practice ethical and responsible oral communications appropriately to a variety of audiences and purposes.	
Outcome 4.1 - Identify and analyze the audience and purpose of any intended communication.	1
Outcome 4.2 - Gather, evaluate, select, and organize information for the communication.	2
Outcome 4.3 - Use language, techniques, and strategies appropriate to the audience and occasion.	0
Outcome 4.4 - Speak clearly and confidently, using the voice, volume, tone, and articulation appropriate to the audience and occasion.	1
Outcome 4.5 - Summarize, analyze, and evaluate oral communications and ask coherent questions as needed.	0
Outcome 4.6 - Use competent oral expression to initiate and sustain discussions.	1
Standard 5 - Critical Thinking Apply critical thinking skills to effectively address the challenges and solve problems.	
Outcome 5.1 - Identify and state problems, issues, arguments, and questions contained in a body of information.	3
Outcome 5.2 - Identify and analyze assumptions and underlying points of view relating to an issue or problem.	2
Outcome 5.3 - Formulate research questions that require descriptive and explanatory analyses.	1
Outcome 5.4 - Recognize and understand multiple modes of inquiry, including investigative methods based on observation and analysis.	2
Outcome 5.5 - Evaluate a problem, distinguishing between relevant and irrelevant facts, opinions, assumptions, issues, values, and biases through the use of appropriate evidence.	2
Outcome 5.6 - Apply problem-solving techniques and skills, including the rules of logic and logical sequence.	3
Outcome 5.7 - Synthesize information from various sources, drawing appropriate conclusions.	1
Outcome 5.8 - Communicate clearly and concisely the methods and results of logical reasoning.	2
Outcome 5.9 - Reflect upon and evaluate their thought processes, value system, and world views in comparison to those of others.	1
Standard 6 - Creativity Able to express originality through a variety of forms.	
Outcome 6.1: Generate responses to problems and challenges through intuition and non-linear thinking.	1
Outcome 6.2: Explore diverse approaches to solving a problem or addressing a challenge.	2
Outcome 6.3: Sustain engagement in activities without a preconceived purpose.	1
Outcome 6.4: Apply creative principles to discover and express new ideas.	1
Outcome 6.5: Demonstrate the ability to trust and follow one's instincts in the absence of external direction	0
Outcome 6.6: Build upon or adapt the ideas of others to create novel expressions or new solutions.	1

33. Additional Information