Wharton County Junior College

Administrative Master Syllabus

Course Information

Course Title	University Physics I
Course Prefix, Num. and Title	PHYS 2425
Division	Math & Physical Sciences
Department	Physics & Engineering
Course Type	Academic WCJC Core Course
Course Catalog Description	Fundamental principles of physics, using calculus, for science, computer science, and engineering majors; the principles and applications of classical mechanics, including harmonic motion, physical systems and thermodynamics. Emphasis is placed on problem solving. Laboratory experiments support theoretical principles presented in lecture; includes experimental design, data collection and analysis, and preparation of laboratory reports.
Pre-Requisites	MATH 2413; concurrent enrollment in MATH 2414 is recommended (see PHYS 2426 prerequisites)
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours: Lab/Other Hours	4:3:3
Equated Pay Hours	4.8
Lab/Other Hours Breakdown: Lab Hours	3
Lab/Other Hours Breakdown: Clinical Hours	0
Lab/Other Hours Breakdown: Practicum Hours	0
Other Hours Breakdown	0

Approval Signatures

Title	Signature	Date
Prepared by:	Kamile Yagci Digitally signed by Kamile Yagci DN: cn=Kamile Yagci, o=Wharton County Juinor College, ou=Physics and Engineering, email=yagcik@wcjc.edu, c=US Date: 2020.04.23 01:24:13 -05'00'	4-23-2020
Department Head:	Kamile Yagci Digitally signed by Kamile Yagci DN: cn=Kamile Yagci, o=Wharton County Juinor College, ou=Physics and Engineering, email=yagcik@wcjc.edu, c=US Date: 2020.04.23 01:24:06 -05'00'	4-23-2020
Division Chair:	Jennifer Mauch Digitally signed by Jennifer Mauch DN: cn=Jennifer Mauch, o, ou=Wharton County Junior College, email=mauchj@wcjc.edu, c=US Date: 2020.04.21 11:55:36 -05'00'	4-21-2020
Dean/VPI:	Leigh Ann collins Digitally signed by Leigh Ann collins DN: cn=Leigh Ann collins, o=WCJC, ou=VPI, email=lacollins@wcjc.edu, c=US Date: 2020.04.23 15:42:06 -05'00'	4-23-20
Approved by CIR:	Paul J. Quinn Digitally signed by Paul J. Quinn Date: 2020.04.27 13:17:21 -05'00'	12-11-19

Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

Lecture Outline:
Syllabus and Class Introduction
CH 1 Units, Physical Quantities and Vectors
CH 2 Motion Along a Straight Line
CH 3 Motion in Two or Three Dimensions
CH 4 Newton's Law of Motion
CH 5 Applying Newton's Laws
CH 6 Work and Kinetic Energy
CH 7 Potential Energy and Conservation of Energy
CH 8 Momentum, Impulse, and Collisions
CH 9 Rotation of Rigid Bodies
CH 10 Dynamics of Rotational Motion
CH 11 Equilibrium and Elasticity
CH 12 Fluid Mechanics
CH 13 Gravitation
CH 14 Periodic Motion
CH 17 Temperature and Heat
CH 18 Thermal Properties of Matter
CH 19 The First Law of Thermodynamics
CH 20 The Second Law of Thermodynamics

Laboratory Outline: Each offering of this course must include 11-13 experiments selected from the below list.
Syllabus and Lab Orientation
Measurement and Error - Extended
Graph Matching - Extended
Cart on a Ramp - Extended
Picket Fence Free Fall – Extended
Projectile Motion
Force Table - Extended
Atwood's Machine - Extended
Coefficients of Friction - Extended
Centripetal Force
Conservation of Energy - Extended
Momentum, Energy and Collisions - Extended
Rotational Inertia of a Disk and a Ring
Simple Pendulum - Extended
Buoyant Force - Extended
Calorimetry - Extended
Behavior of a Gas - Extended
Speed of Sound - Extended

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

Lecture:

1. Determine the components of linear motion (displacement, velocity, and acceleration), and especially motion under conditions of constant acceleration.

2. Solve problems involving forces and work.
3. Apply Newton's laws to physical problems.
4. Identify the different types of energy.
5. Solve problems using principles of energy conservation.
6. Define the principles of impulse, momentum, and collisions.
7. Use principles of impulse and linear momentum to solve problems.
8. Determine the location of the center of mass and center of rotation for rigid bodies in motion.
9. Discuss rotational kinematics and dynamics and the relationship between linear and rotational motion.
10. Solve problems involving rotational and linear motion.
11. Define equilibrium, including the different types of equilibrium.
12. Discuss simple harmonic motion and its application to real-world problems.
13. Solve problems involving the First and Second Laws of Thermodynamics.

Laboratory:
14. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.
15. Conduct basic laboratory experiments involving classical mechanics.
16. Relate physical observations and measurements involving classical mechanics to theoretical principles.
17. Evaluate the accuracy of physical measurements and the potential sources of error in the measurements.
18. Design fundamental experiments involving principles of classical mechanics.
19. Identify appropriate sources of information for conducting laboratory experiments involving classical mechanics.

Methods of Assessment:

Outcomes assessed by:
Final exam, chapter exams, quizzes, class work and homework assignments

Lab outcomes assessed by:
Lab exam and lab reports

Required text(s), optional text(s) and/or materials to be supplied by the student:

Young & Freedman, *University Physics with Modern Physics*, 15th Edition, Pearson (required)
Scientific calculator (optional at Instructor's discretion)

Students must have computer access to the WCJC website, their WCJC student email and online accounts. WCJC has open computer labs, with internet access, on all campuses for students to use.

Suggested Course Maximum:

36

List any specific or physical requirements beyond a typical classroom required to teach the course.

Physics laboratory classroom required for the lab component of the course

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

Lecture average:

Exam average (3 or 4 exams)	30–55%
Other (homework, quizzes, projects, attendance, class work, etc.)	0–25%
Laboratory average: (based on Laboratory average below)	25%
Final Exam: (includes at least 50% comprehensive material)	20–25%
	100% course total

Laboratory average*:	
Lab reports	20–75%
Other (lab notebook, pre-lab assignments, quizzes, etc.)	25–80%
Lab exam	5-25%
	100% lab total

*Department policy: A student must earn a 60% laboratory grade or greater in order to pass the course.

The overall course grade is assigned as specified by the college:
A = 90–100
B = 80–89
C = 70–79
D = 60–69
F = below 60

Curriculum Checklist:

☐**Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

☒**Administrative WCJC Core Course**. Attach the Core Curriculum Review Forms

- ☒Critical Thinking
- ☒Communication
- ☒Empirical & Quantitative Skills
- ☒Teamwork
- ☐Social Responsibility
- ☐Personal Responsibility

☐**WECM Course** -If needed, revise the Program SCANS Matrix and Competencies Checklist

Wharton County Junior College

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2425

Core Objective:
Critical Thinking Skills—to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

Student Learning Outcome Supporting Core Objective:
For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Define the principles of impulse, momentum, and collisions. (AMS SLO #6)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Conduct basic laboratory experiments involving classical mechanics. (AMS SLO #15)	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.

Date: 12/2/2019

Wharton County Junior College

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2425

Core Objective:
Communication Skills—to include effective development, interpretation and expression of ideas through written, oral and visual communication

Student Learning Outcome Supporting Core Objective:
For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Define the principles of impulse, momentum, and collisions. (AMS SLO #6)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner. (AMS SLO #14)	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.

Wharton County Junior College

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2425

Core Objective:
Empirical and Quantitative Skills—to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

Student Learning Outcome Supporting Core Objective:
For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Define the principles of impulse, momentum, and collisions. (AMS SLO #6)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Conduct basic laboratory experiments involving classical mechanics. (AMS SLO #15)	Laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
State Mandated	Insert SLO (from Administrative Master Syllabi)	Provide a brief name and description of the sample learning activity.	Provide a brief name and description of the sample quiz, exam, rubric, assignment, etc. for assessing the objective.

Wharton County Junior College

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2425

Core Objective:
Teamwork—to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

Student Learning Outcome Supporting Core Objective:
For each core objective, there must be at least two different methods of assessment.

SLO Status	Student Learning Outcome (SLO)	Learning Activity	Assessment
State Mandated	Define the principles of impulse, momentum, and collisions. (AMS SLO #6)	Lecture and laboratory experiment (Momentum, Energy and Collisions)	Lab report, exam
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Date: 12/2/2019