

Administrative Master Syllabus

Course Information

Course Title	University Physics II
Course Prefix, Num. and Title	PHYS 2426
Division	Math & Physical Sciences
Department	Physics & Engineering
Course Type	Academic WCJC Core Course
Course Catalog Description	Continuation of PHYS 2425. Principles of physics for science, computer science, and engineering majors, using calculus, involving the principles of electricity and magnetism, including circuits, electromagnetism, waves, sound, light, and optics. Laboratory experiments support theoretical principles presented in lecture; includes experimental design, data collection and analysis, and preparation of laboratory reports.
Pre-Requisites	PHYS 2425 with a grade of "C" or better and MATH 2414
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours:	4:3:3
Lab/Other Hours	
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
Department Head:	<i>Rocio Doherty</i>	12/08/23
Division Chair:		12-11-23
VPI:		

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 15 Mechanical Waves
- CH 16 Sound and Hearing
- CH 21 Electric Charge and Electric Field
- CH 22 Gauss's Law
- CH 23 Electric Potential
- CH 24 Capacitance and Dielectrics
- CH 25 Current, Resistance, and Electromotive Force
- CH 26 Direct-Current Circuits
- CH 27 Magnetic Field and Magnetic Forces
- CH 28 Sources of Magnetic Field
- CH 29 Electromagnetic Induction
- CH 30 Inductance
- CH 31 Alternating Current
- CH 32 Electromagnetic Waves
- CH 33 The Nature and Propagation of Light
- CH 34 Geometric Optics
- CH 35 Interference
- CH 36 Diffraction

Laboratory Outline:

Syllabus and Lab Orientation

- Speed of Sound
- Use of Multimeter and Power Supply
- Static Electricity
- Electric Field Mapping
- Ohm's Law
- Series and Parallel Circuits
- Kirchhoff's Laws in DC Circuits
- Capacitors
- Magnetic Field Mapping
- Magnetic Force on a Wire
- Magnetic Field in a Coil
- Faraday's Law: Moving Magnet
- Image Formation in a Plane Mirror
- Law of Refraction
- Converging Lens
- Two-Slit Interference

Course Learning Outcomes:

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

Lecture:

1. Articulate the fundamental concepts of electricity and electromagnetism, including electrostatic potential energy, electrostatic potential, potential difference, magnetic field, induction, and Maxwell's Laws.
2. State the general nature of electrical forces and electrical charges, and their relationship to electric current.
3. Solve problems involving the inter-relationship of charged particles, electrical forces, and electric fields.
4. Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.
5. Calculate the force on a charged particle between the plates of a parallel-plate capacitor.
6. Apply Ohm's law to the solution of problems.
7. Describe the effects of static charge on nearby materials in terms of Coulomb's Law.
8. Use Faraday's and Lenz's laws to find electromotive forces.
9. Describe the components of a wave and relate those components to mechanical vibrations, sound, and decibel level.
10. Articulate the principles of reflection, refraction, diffraction, interference, and superposition of waves.
11. Solve real-world problems involving optics, lenses, and mirrors.

Laboratory:

1. Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.
2. Conduct basic laboratory experiments involving electricity and magnetism.
3. Relate physical observations and measurements involving electricity and magnetism to theoretical principles.
4. Evaluate the accuracy of physical measurements and the potential sources of error in the measurements.
5. Design fundamental experiments involving principles of electricity and magnetism.
6. Identify appropriate sources of information for conducting laboratory experiments involving electricity and magnetism.

Methods of Assessment:

Outcomes assessed by:

Final exam, tests, 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) (ISBN 978-0-1352-0634-8)

University Physics II Lab Manual, 1st Edition, Wharton County Junior College; (ISBN: 978-1-5339-3140-5)

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 (3-4 exams)	30-55%
Other (homework, quizzes, projects, attendance, class work, etc)	0-25%
Laboratory Average (based on lab avg 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.)	20-80%
Lab exam	5-25%
	100% lab total

*Department policy: A student must earn a 60% laboratory grade or greater 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

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2426

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	(Lecture SLO #4) Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.	Lecture and laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
State Mandated	(Laboratory SLO #2) Conduct basic laboratory experiments involving electricity and magnetism.	Laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
Choose a SLO status.	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.

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2426

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	(Lecture SLO #4) Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.	Lecture and laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
State Mandated	(Laboratory SLO #1) Prepare laboratory reports that clearly communicate experimental information in a logical and scientific manner.	Laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
Choose a SLO status.	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.

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2426

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	(Lecture SLO #4) Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.	Lecture and laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
State Mandated	(Laboratory SLO #2) Conduct basic laboratory experiments involving electricity and magnetism.	Laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
Choose a SLO status.	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.

Core Curriculum Review Form

Foundational Component Area: Core 030: Life & Physical Science

Course Prefix & Suffix: PHYS 2426

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	(Lecture SLO #4) Apply Kirchhoff's Rules to analysis of circuits with potential sources, capacitance, inductance, and resistance, including parallel and series capacitance and resistance.	Lecture and laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
State Mandated	(Laboratory SLO #2) Conduct basic laboratory experiments involving electricity and magnetism.	Laboratory experiment (Kirchhoff's Laws in DC Circuits)	Lab report, exam
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