

Washtenaw Community College Comprehensive Report

PHY 122 General Physics II Effective Term: Spring/Summer 2023

Course Cover

College: Math, Science and Engineering Tech

Division: Math, Science and Engineering Tech

Department: Physical Sciences

Discipline: Physics

Course Number: 122

Org Number: 12340

Full Course Title: General Physics II

Transcript Title: General Physics II

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Consultation with all departments affected by this course is required.

Course description

Pre-requisite, co-requisite, or enrollment restrictions

Outcomes/Assessment

Objectives/Evaluation

Rationale: To update the course outcomes and objectives based on the assessment results and to better align with the transfer University's requirements.

Proposed Start Semester: Winter 2023

Course Description: This course is the second part of a two-course sequence in algebra-trigonometry based physics for pre-professional and liberal arts students. It covers the concepts of electricity, magnetism, and light extending the students' knowledge of physics learned in the prerequisite course. Laboratory exercises are included to assist students in understanding the above topics.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 Student: 45

Lab: Instructor: 45 Student: 45

Clinical: Instructor: 0 Student: 0

Total Contact Hours: Instructor: 90 Student: 90

Repeatable for Credit: NO

Grading Methods: Letter Grades

Audit

Are lectures, labs, or clinicals offered as separate sections?: NO (same sections)

College-Level Reading and Writing

College-level Reading & Writing

College-Level Math

No Level Required

Requisites**Prerequisite**

PHY 111 minimum grade "C"

General Education**MACRAO**

MACRAO Science & Math

MACRAO Lab Science Course

General Education Area 4 - Natural Science

Assoc in Applied Sci - Area 4

Assoc in Science - Area 4

Assoc in Arts - Area 4

Michigan Transfer Agreement - MTA

MTA Lab Science

Request Course Transfer**Proposed For:**

Eastern Michigan University

Lawrence Tech

Michigan State University

University of Detroit - Mercy

University of Michigan

Wayne State University

Western Michigan University

Student Learning Outcomes

1. Recognize and identify principles and concepts and solve problems associated with electricity, magnetism, and light.

Assessment 1

Assessment Tool: Outcome-related written exam questions

Assessment Date: Winter 2025

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Multiple-choice questions will be scored using a key.

Standard of success to be used for this assessment: 70% of students will score 75% or higher.

Who will score and analyze the data: Full-time Physics faculty

2. Perform labs to solve problems pertaining to electricity, magnetism, and light.

Assessment 1

Assessment Tool: Outcome-related lab quiz questions

Assessment Date: Winter 2025

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: All students

How the assessment will be scored: Multiple-choice questions will be scored using a key; and the short answer questions will be scored using a departmentally developed rubric.

Standard of success to be used for this assessment: 70% of students will score 75% or higher.

Who will score and analyze the data: Full-time Physics faculty

Course Objectives

1. Define the concepts of electric charge, electricity and matter (conductors versus insulators), electric field lines, capacitance and electric energy in a field.

2. Solve problems using Coulomb's law.
3. Solve problems involving electric field, potential difference and capacitors in combination.
4. Solve problems using capacitors with dielectrics.
5. Define the concepts of electric current and resistivity.
6. Solve problems using Ohm's law, resistance and temperature, internal resistance, resistors in series, resistors in parallel, Kirchhoff's rules and capacitive time constant.
7. Solve problems involving electric power.
8. Describe the concepts of the magnetic field, ferromagnetism, right-hand rule for magnetism, magnetic poles and the torque principle for galvanometers and motors.
9. Solve problems dealing with the magnetic field of a current carrying solenoid, force on a moving charge, orbit radius of a circling charge and force between two parallel wires.
10. Explain the concept of induced Electromotive Force (EMF), Faraday's Law, Lenz's law and magnetic energy in a field.
11. Solve problems using effective current and voltage, inductive reactance, capacitive reactance, impedance, Ohm's law and A.C. and electrical resonance.
12. Describe the concept of electromagnetic waves, speed of light, electromagnetic spectrum and reflection.
13. Solve problems using wave equations and speed of electromagnetic waves.
14. Demonstrate the concept of lens equation, focal length, real versus virtual images and Snell's law.
15. Solve problems using Snell's law, image formation with lenses, image formation with mirrors, magnification, ray tracing for lenses and mirrors, total internal reflection and refraction.
16. Explain the concepts of Huygens' principle, interference of light, diffraction of light and Young's double-slit experiment.
17. Solve problems using double-slit interference, diffraction gratings, single-slit diffraction, and interference by thin films and polarization.
18. Solve problems using the concepts of microscope and corrective lenses for the eyes.
19. Describe the concepts of the human eye, the camera, lens aberrations and corrective lenses.

New Resources for Course

Course Textbooks/Resources

Textbooks

Serway/Vuille. *College Physics*, 11th ed. Cengage, 2018, ISBN: 978-1-305-965.

Manuals

Periodicals

Software

Equipment/Facilities

Level III classroom

Testing Center

| <u>Reviewer</u> | <u>Action</u> | <u>Date</u> |
|---|---------------------------|---------------------|
| Faculty Preparer: <i>Weishu Bu</i> | <i>Faculty Preparer</i> | <i>Nov 01, 2022</i> |
| Department Chair/Area Director: <i>Suzanne Albach</i> | <i>Recommend Approval</i> | <i>Nov 01, 2022</i> |
| Dean: <i>Tracy Schwab</i> | <i>Recommend Approval</i> | <i>Nov 02, 2022</i> |
| Curriculum Committee Chair: <i>Randy Van Wagnen</i> | <i>Recommend Approval</i> | <i>Dec 09, 2022</i> |
| Assessment Committee Chair: | | |

Shawn Deron

Recommend Approval

Dec 23, 2022

Vice President for Instruction:

Victor Vega

Approve

Jan 13, 2023

Washtenaw Community College Comprehensive Report

PHY 122 General Physics II

Effective Term: Fall 2020

Course Cover

Division: Math, Science and Engineering Tech

Department: Physical Sciences

Discipline: Physics

Course Number: 122

Org Number: 12340

Full Course Title: General Physics II

Transcript Title: General Physics II

Is Consultation with other department(s) required: No

Publish in the Following: College Catalog , Time Schedule , Web Page

Reason for Submission: Three Year Review / Assessment Report

Change Information:

Outcomes/Assessment

Rationale: Updates to assessment plan based on assessment report.

Proposed Start Semester: Fall 2020

Course Description: This course is the second part of a two-course sequence in algebra-trigonometry based physics for pre-professional and liberal arts students. It covers the concepts of electricity, magnetism, light and modern physics extending the students' knowledge of physics learned in the prerequisite course. Laboratory exercises are included to assist students in understanding the above topics.

Course Credit Hours

Variable hours: No

Credits: 4

Lecture Hours: Instructor: 45 **Student:** 45

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No Level Required

Requisites

Prerequisite

PHY 111 minimum grade "C"

General Education

MACRAO

MACRAO Science & Math

MACRAO Lab Science Course

General Education Area 4 - Natural Science

Assoc in Applied Sci - Area 4

Assoc in Science - Area 4

Assoc in Arts - Area 4

Michigan Transfer Agreement - MTA

MTA Lab Science

Request Course Transfer**Proposed For:****Student Learning Outcomes**

1. Apply the appropriate principles to solve problems pertaining to electricity, magnetism, light and modern physics.

Assessment 1

Assessment Tool: Written exam

Assessment Date: Fall 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: A random sample of approximately 20% of all students

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students will score 75% or higher.

Who will score and analyze the data: Full-time Physics faculty

2. Solve problems pertaining to electricity, magnetism, light and modern physic[s].

Assessment 1

Assessment Tool: Laboratory reports

Assessment Date: Fall 2022

Assessment Cycle: Every Three Years

Course section(s)/other population: All sections

Number students to be assessed: A random sample of approximately 20% of all students

How the assessment will be scored: Departmentally-developed rubric

Standard of success to be used for this assessment: 70% of students will score 75% or higher.

Who will score and analyze the data: Full-time Physics faculty

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9. Solve problems dealing with the magnetic field of a current carrying solenoid, force on a moving charge, orbit radius of a circling charge and force between two parallel wires.
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17. Solve problems using double-slit interference, diffraction gratings, single-slit diffraction, and interference by thin films and polarization.
18. Solve problems using the concepts of microscope and corrective lenses for the eyes.
19. Describe the concepts of the human eye, the camera, lens aberrations and corrective lenses.
20. Solve problems involving time dilation, simultaneity, length contraction and relativistic kinetic energy.
21. Explain the concepts underlying the Michelson-Morley experiment.

New Resources for Course

Course Textbooks/Resources

Textbooks
Manuals
Periodicals
Software

Equipment/Facilities

Level III classroom

| <u>Reviewer</u> | <u>Action</u> | <u>Date</u> |
|---|---------------------------|---------------------|
| Faculty Preparer: <i>Amir Fayaz</i> | <i>Faculty Preparer</i> | <i>Mar 03, 2020</i> |
| Department Chair/Area Director: <i>Suzanne Albach</i> | <i>Recommend Approval</i> | <i>Mar 09, 2020</i> |
| Dean: <i>Victor Vega</i> | <i>Recommend Approval</i> | <i>Mar 11, 2020</i> |
| Curriculum Committee Chair: <i>Lisa Veasey</i> | <i>Recommend Approval</i> | <i>Jun 15, 2020</i> |
| Assessment Committee Chair: <i>Shawn Deron</i> | <i>Recommend Approval</i> | <i>Jul 14, 2020</i> |
| Vice President for Instruction: <i>Kimberly Hurns</i> | <i>Approve</i> | <i>Jul 16, 2020</i> |