Course Syllabus

Course Information

Course Title: General Education Physics

Subject and Number: PHY 1020

Course Description: This course offers a comprehensive survey of physics, covering a wide range of topics including motion, newton's laws, energy, sound, heat, electricity, magnetism, and optics. Emphasizing a conceptual understanding of physics, the course integrates critical thinking skills and real-world applications. Student learning outcomes: students will critically evaluate everyday phenomena using the scientific method; students will explain the basis of physical principles (such as conservation laws) and how they apply to everyday phenomena; students will interpret information conveyed in diagrams and graphs; and students will perform simple calculations relevant to real world problems.

Class Number: LOREM IPSUM

Term and Year: LOREM IPSUM

Course Modality: MDC Modalities

Instructor Information

Name: LOREM IPSUM

Department and Campus: LOREM IPSUM

Office location: LOREM IPSUM

Office hours: *(communicate course office hours with students)*

Phone number: 123-456-7890

Email: LOREM IPSUM

Communication Policy: *(Faculty will establish protocols for communication with students)*

Required Textbook, Course Materials, and Technology

Required course materials: *(Textbook(s), library reserves, shark pack, and/or other required readings. Include ISBN Number and author(s))*

List optional/supplemental materials/OER: LOREM IPSUM

Technology & Technical Skill Requirements: *(Technology tools or equipment students need to complete this course are included)*

Grading Policy & Assessment Methods

List all activities, papers, quizzes, tests, etc. including grading scale used for final grade calculation. Relationships between the final grade and the learner's accumulated points or percentages/weights breakdown for each assessment or component of the course grade.

Include policy on late submissions.

For MDC Live and MDC Online courses, include policy regarding exams (e.g., ProctorU, Respondus Lockdown and Monitor, etc.)

If applicable, include guidelines for extra credit.

Incomplete Grades: View the college's procedures for Incomplete Grades

Miami Dade College Policies

Attendance Policy: *(Faculty include precise statements about illnesses/emergencies/ tardiness, missed assignments/make-up.)*

Students Rights and Responsibilities: *Policies addressing academic integrity and plagiarism, code of conduct, grade appeals, religious observations, services for students with special needs, student complaints, and other.*

For more information, visit the Student's Rights and Responsibilities page

Available Support Services & Resources

- Tutoring Labs and Technology – Learning Resources
- Virtual Tutoring through Learning Resources or Smarthinking Online Tutoring
- ACCESS: A Comprehensive Center for Exceptional Student Services
- Advisement
- Password and Login Technical Support
- Technical Support for MDC Live and MDC Online Courses
- SMART Plan

(Faculty select from the above if applicable and include additional course/campus specific resources)

Available Support Services & Resources

- Public Safety - Services

- Hurricane and Other Natural Disasters: In the event of a hurricane or other disaster, the class follows the schedule established by the College for campus-based courses. Please visit the MDC website or call the MDC Hotline (305-237-7500) for situation updates.

Course Description

PHY1020 | General Education Physics | 3 credits

This course offers a comprehensive survey of physics, covering a wide range of topics including motion, newton's laws, energy, sound, heat, electricity, magnetism, and optics. Emphasizing a conceptual understanding of physics, the course integrates critical thinking skills and real-world applications. Student learning outcomes: students will critically evaluate everyday phenomena using the scientific method; students will explain the basis of physical principles (such as conservation laws) and how they apply to everyday phenomena; students will interpret information conveyed in diagrams and graphs; and students will perform simple calculations relevant to real world problems.

Course Competencies

Competency 1:

The student will demonstrate knowledge of what science is by:

- Describing the steps involved in the scientific method.
- Recognizing the necessity of the scientific method for understanding the physical world.
- Identifying important contributions of science to technology, economics, history and society.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 2:

The student will demonstrate knowledge of what physics is by:

- Describing the subject of study, scope and limitations of physics as a science.
- Identifying the major subdivisions of physics.
- Identifying important physicists.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 3:

The student will demonstrate knowledge of the scientific notation by:

- Describing the standard form of scientific notation.
- Expressing various numbers in scientific notation.

- Utilizing scientific notation to perform basic numerical operations.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 4:

The student will demonstrate knowledge of scientific units and measurements by:

- Identifying the main systems of units.
- Identifying the main multiples and submultiples within each system.
- Distinguishing between base units and derived units.
- Converting measurements.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 5:

The student will demonstrate knowledge of kinematics by:

- Identifying the main types of motion.
- Describing motion in terms of position, distance, speed, velocity and acceleration.
- Performing basic calculations on motion.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 6:

The student will demonstrate knowledge of dynamics by:

- Identifying force as the cause of motion.
- Distinguishing between mass and weight.
- Describing Newton's laws of motion.
- Performing basic calculations using the laws of motion.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 7:

The student will demonstrate knowledge of conservation laws by:

- Distinguishing between work, kinetic energy, potential energy, total energy, and linear momentum and angular momentum.
- Expressing and using in basic calculations the law of conservation of energy.
- Expressing and using in basic calculations the law of conservation of linear momentum.
- Expressing and using in basic calculations the law of conservation of angular momentum.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 8:

The student will demonstrate knowledge of fluids by:

- Distinguishing between density and pressure.
- Describing Pascal's principle and its applications.
- Describing Archimedes' principle and its applications.
- Describing Bernoulli's principle and its applications.
- Distinguishing the different kinds of fluid flow.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 9:

The student will demonstrate knowledge of thermodynamics by:

- Describing the laws of thermodynamics.
- Distinguishing between temperature and heat.
- Identifying the main types of heat flow.
- Describing the relationship between temperature, pressure and volume.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 10:

The student will demonstrate knowledge of electricity by:

- Distinguishing between electric charge, electric force, electric field, electric potential and electric current.
- Describing Coulomb's law and using it in basic calculations.
- Describing Ohm's law and using it in basic calculations.
- Distinguishing between series and parallel connections in circuits.
- Distinguishing between direct and alternating currents.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 11:

The student will demonstrate knowledge of magnetism by:

- Distinguishing between magnets, magnetic force, magnetic field, and magnetic torque.
- Describing how magnetic fields affect the motion of charges and currents.
- Describing electromagnetic induction and its applications.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 12:

The student will demonstrate knowledge of optics by:

- Distinguishing between ray and wave front.
- Distinguishing between reflection, refraction, dispersion, interference and diffraction.
- Describing the law of reflection and using it in basic calculations.
- Describing the law of refraction and using it in basic calculations.
- Identifying fundamental optical instruments.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 13:

The student will demonstrate knowledge of relativity by:

- Describing the postulates of special relativity.
- Describing time dilation and length contraction.
- Describing the relation between mass and energy and its implications.
- Describing the general ideas of general relativity and its implications.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data

Competency 14:

The student will demonstrate knowledge of atomic, nuclear and particle physics by:

- Describing the main components of the atom.
- Describing Bohr's model of the atom.
- Describing the quantized nature of atomic properties.
- Describing nuclear particles and the force between them.
- Describing radioactivity and identifying its main types.
- Identifying the main types of subatomic particles.

Learning Outcomes

- Communication
- Critical thinking
- Numbers / Data