

# Course Syllabus

## Course Information

**Course Title:** Physics with Calculus 1

**Subject and Number:** PHY 2048

**Course Description:** Foundation course for physical science and engineering majors. PHY 2048 covers classical mechanics and thermodynamics. PHY 2049 includes electricity, magnetism, waves and optics. Prerequisites: High school physics or PHY 1025, PHY 2053 or departmental approval and MAC 2311; Corequisite: PHY 2048L.

**Class Number:** LOREM IPSUM

**Term and Year:** LOREM IPSUM

**Course Modality:** [MDC Modalities](https://www.mdc.edu/registration/options/default.aspx)

## 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](https://www.mdc.edu/procedures/Chapter8/8381.pdf)

## 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](https://www.mdc.edu/rightsandresponsibilities/)

## Available Support Services & Resources

* [Tutoring Labs and Technology – Learning Resources](https://www.mdc.edu/learning-resources/tutoring-labs-technology/)
* [Virtual Tutoring through Learning Resources or Smarthinking Online Tutoring](https://libraryguides.mdc.edu/BbLTutoring)
* [ACCESS: A Comprehensive Center for Exceptional Student Services](https://www.mdc.edu/access/)
* [Advisement](https://www.mdc.edu/advisement/)
* [Password and Login Technical Support](https://www.mdc.edu/registration/password.aspx)
* [Technical Support for MDC Live and MDC Online Courses](https://www.mdc.edu/online/resources/tech-support.aspx)
* [SMART Plan](https://www.mdc.edu/smart/)

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

## Available Support Services & Resources

* [Public Safety - Services](https://www.mdc.edu/safety/services/)
* [Hurricane and Other Natural Disasters:](https://www.mdc.edu/safety/in-case-of-emergency/) 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

**PHY2048 | Physics with Calculus 1 | 4 credits**

Foundation course for physical science and engineering majors. PHY 2048 covers classical mechanics and thermodynamics. PHY 2049 includes electricity, magnetism, waves and optics. Prerequisites: High school physics or PHY 1025, PHY 2053 or departmental approval and MAC 2311; Corequisite: PHY 2048L.

## Course Competencies

### Competency 1:

The student will demonstrate an understanding of the scientific method by:

* Explaining how the scientific method differs from day-to-day application of observation, generalization, and prediction.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 2:

The student will demonstrate an understanding of basic kinematics by:

* Explaining the difference between average and instantaneous velocity or acceleration.
* Applying techniques from calculus to calculate the velocity and acceleration of an object when the position is given as a function of time.
* Using kinematics equations to calculate later position and velocity for an object undergoing constant acceleration in one or two dimensions.
* Using the Galilean formulas to transform a velocity or acceleration from one reference frame to another.
* Calculating centripetal acceleration for an object moving in a circle.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 3:

The student will demonstrate an understanding of translational dynamics and gravity by:

* Sketching a "free body" diagram to represent the forces acting on a system of masses.
* Expressing static or kinetic friction in terms of the normal forces.
* Writing and solving a set of component force equations for each mass in the system.
* Calculating the properties of a circular orbit.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 4:

The student will demonstrate an understanding of the concepts of work and energy by:

* Using integration to calculate the work which a force does on a moving object.
* Calculating the power which a force supplies to a moving object.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 5:

The student will demonstrate an understanding of the concepts of momentum and center of mass by:

* Locating the center of mass of an objector a system of objects.
* Finding the momentum change resulting from an impulse.
* Solving collision problems using conservation of momentum in one or two dimensions.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 6:

The student will demonstrate an understanding of rotational quantities by:

* Using the equations of rotational kinematics to calculate a later angular position and angular velocity for an object undergoing a constant angular acceleration.
* Calculating the moment of inertia fora symmetrical object.
* Finding the resultant torque caused by one or more forces acting on an object.
* Find the acceleration of a rotating object subject to torques.
* Find the kinetic energy of a rotating system.
* Solving a collision problem involving angular momentum.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 7:

The student will demonstrate an understanding of the behavior of solids and fluids by:

* Applying equations of stress and strain.
* Finding the force generated by pressure at a given depth in a fluid.
* Solving statics problems involving buoyancy.
* Applying Bernoulli's equation to fluid flow.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data

### Competency 8:

The student will demonstrate an understanding of harmonic motion by:

* Finding the angular frequency and period of oscillation for a mass subject to a linear restoring force.
* Finding the position, velocity, acceleration, and energies as functions of time for an object undergoing simple harmonic motion.

Learning Outcomes

* Critical thinking
* Information Literacy
* Numbers / Data