

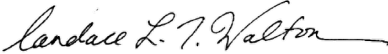







**Syllabus**  
**PHYS2110**  
**General Physics I with Calculus**  
**2019**

**Committee Members:**

No representative, Central Community College  
No representative, Little Priest Tribal College  
Kendra Sibbensen, Metropolitan Community College  
Jared Daily, Mid-Plains Community College  
Dasha Weatherman, Nebraska Indian Community College  
David Heidt, Northeast Community College  
Paul Haar, Southeast Community College  
Scott Schaub, Western Nebraska Community College

**Facilitator: Paul Haar**

**The Institution agrees to the contents in this syllabus including course prefix, number, course description and other contents of this syllabus.**

 Candace L. T. Walton Chief Academic Officer, Central Community College	Adopt
 <a href="#">Manoj Patil (Apr 17, 2019)</a> Chief Academic Officer, Little Priest Tribal College	Not Offered
 <a href="#">Thomas J McDonnell (Apr 17, 2019)</a> Chief Academic Officer, Metropolitan Community College	Decline
 <a href="#">Jody Tomanek (Apr 17, 2019)</a> Chief Academic Officer, Mid-Plains Community College	Adopt
 <a href="#">Kristine Sudbeck (May 16, 2019)</a> Chief Academic Officer, Nebraska Indian Community College	Not Offered
 <a href="#">Lyle Kathol (Apr 18, 2019)</a> Chief Academic Officer, Northeast Community College	Adopt
 <a href="#">Dennis Headrick (Apr 17, 2019)</a> Chief Academic Officer, Southeast Community College	Adopt
 <a href="#">Kim Kuster Dale (Apr 23, 2019)</a> Chief Academic Officer, Western Nebraska Community College	Adopt

## I. CATALOG DESCRIPTION

PHYS2110

General Physics I with Calculus

Prerequisite/Corequisite: MATH 1600 Calculus I or equivalent

Credit Hours: 5 (Semester) 7.5 (Quarter)

Contact Hours: Lecture 60 Lab 30

**Course Description:** Detailed calculus-based study of one and two dimensional motion. Topics will include kinematics, Newton's Laws, energy, momentum, and rotational motion. Additional topics from the areas of oscillations and waves, fluids, and heat may also be covered.

## II. COURSE OBJECTIVES/COMPETENCIES

Course will:

1. Distinguish between vector and scalar quantities and teach vector operations.
2. Provide methods of analysis for 1-dimensional kinematics.
3. Introduce methods of analysis for multi-dimensional kinematics.
4. Define and apply Newton's laws of motion.
5. Use the concepts of work and energy to solve problems.
6. Apply the concepts of impulse and momentum.
7. Implement the laws of conservation of energy and momentum.
8. Employ kinematics and dynamics in rotational systems.
9. Utilize laws of conservation of energy and momentum for rotational systems.
10. Present techniques for analysis of experimental data.
11. Provide experience communicating experimental results.

## III. STUDENT LEARNING OUTCOMES

Students will be able to:

1. Conduct dimensional analysis.
2. Perform vector analysis.
3. Compare and contrast scalars and vectors.
4. Use displacement, velocity, acceleration, and time to analyze 1-dimension motion.
5. Analyze objects in multi-dimensional motion.
6. Determine relative velocity vectors from multiple points of reference.
7. Distinguish the relationship between motion and Newton's three laws of motion.
8. Analyze forces and motion using Newton's three laws of motion.
9. Determine forces and motion in situations that involve static and kinetic friction.
10. Use the work-energy theorem to relate work and energy.
11. Apply the properties of work, kinetic energy, gravitational potential energy, and spring potential energy using conservation of energy and the work-energy theorem.
12. Calculate properties of work, energy, and power.
13. Analyze the relationship between momentum, impulse, and collisions.
14. Demonstrate the conservation of momentum of objects before and after collision.

15. Analyze properties of angular displacement, angular velocity, angular acceleration, and centripetal acceleration.
16. Use torque, angular acceleration, and moment of inertia to analyze rotational motion and static equilibrium.
17. Apply the properties of conservation of energy and conservation of angular momentum.

#### **IV. COURSE CONTENT/TOPICAL OUTLINE**

(Sequence may vary)

1. Units and Measurement
2. Vectors
3. Linear Motion
4. Motion in Two and Three Dimensions
5. Newton's Laws of Motion
6. Applications of Newton's Laws
7. Work and Kinetic Energy
8. Potential Energy and Conservation of Energy
9. Linear Momentum and Collisions
10. Rotational Motion
11. Angular Momentum
12. Static Equilibrium

#### **V. INSTRUCTIONAL MATERIALS**

##### **SUGGESTED TEXTBOOKS AND/OR MATERIALS**

Physics for Scientists and Engineers – Giancoli

OpenStax University Physics – OER

College Physics – Serway

Physics for Scientists and Engineers – Knight

University Physics - Sears

#### **VI. METHODS OF PRESENTATION**

Methods of presentation may include lecture, small group activities, videos, lab activities, worksheets, quizzes, online exploration, and student presentations.

#### **VII. METHODS OF EVALUATION**

1. Unit Tests
2. Comprehensive Final Exam
3. Quizzes
4. Assignments
5. Lab Activities

#### **VIII. INSTITUTIONAL DEFINED SECTION**

*To be used at the discretion of each community college as deemed necessary.*











# PHYS2110 - General Physics I with Calculus - 2019

















Final Audit Report

2019-05-16

Created:	2019-04-17
By:	Tara Naughtin (naughtint@mpcc.edu)
Status:	Signed
Transaction ID:	CBJCHBCAABAAxYLC_cVAQVIOgk-w689GJpgiCtsa3p8z

## "PHYS2110 - General Physics I with Calculus - 2019" History

-  Document created by Tara Naughtin (naughtint@mpcc.edu)  
2019-04-17 - 3:17:54 PM GMT- IP address: 72.15.173.125
-  Document emailed to Candace Walton (candacewalton@cccneb.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document emailed to Manoj Patil (manoj.patil@littlepriest.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document emailed to Thomas J McDonnell (tjmcdonnell3@mccneb.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document emailed to Jody Tomanek (tomanekj@mpcc.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document emailed to Kristine Sudbeck (ksudbeck@thenicc.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document emailed to Lyle Kathol (lylek@northeast.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document emailed to Dennis Headrick (dheadrick@southeast.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document emailed to Kim Kuster Dale (kim.dale@wncc.edu) for signature  
2019-04-17 - 3:23:27 PM GMT
-  Document viewed by Jody Tomanek (tomanekj@mpcc.edu)  
2019-04-17 - 3:25:20 PM GMT- IP address: 72.15.173.125

-  Document e-signed by Jody Tomanek (tomanekj@mpcc.edu)  
Signature Date: 2019-04-17 - 3:25:38 PM GMT - Time Source: server- IP address: 72.15.173.125
-  Document viewed by Manoj Patil (manoj.patil@littlepriest.edu)  
2019-04-17 - 3:53:30 PM GMT- IP address: 72.15.165.2
-  Document viewed by Dennis Headrick (dheadrick@southeast.edu)  
2019-04-17 - 4:06:52 PM GMT- IP address: 64.89.52.20
-  Document e-signed by Dennis Headrick (dheadrick@southeast.edu)  
Signature Date: 2019-04-17 - 4:07:14 PM GMT - Time Source: server- IP address: 64.89.52.20
-  Document e-signed by Manoj Patil (manoj.patil@littlepriest.edu)  
Signature Date: 2019-04-17 - 4:08:49 PM GMT - Time Source: server- IP address: 72.15.165.2
-  Document viewed by Thomas J McDonnell (tjmcdonnell3@mccneb.edu)  
2019-04-17 - 4:43:22 PM GMT- IP address: 199.184.232.1
-  Document e-signed by Thomas J McDonnell (tjmcdonnell3@mccneb.edu)  
Signature Date: 2019-04-17 - 4:43:51 PM GMT - Time Source: server- IP address: 199.184.232.1
-  Document viewed by Lyle Kathol (lylek@northeast.edu)  
2019-04-18 - 10:37:22 PM GMT- IP address: 72.15.171.10
-  Document e-signed by Lyle Kathol (lylek@northeast.edu)  
Signature Date: 2019-04-18 - 10:37:54 PM GMT - Time Source: server- IP address: 72.15.171.10
-  Document viewed by Candace Walton (candacewalton@cccneb.edu)  
2019-04-19 - 6:45:20 PM GMT- IP address: 198.99.91.32
-  Document e-signed by Candace Walton (candacewalton@cccneb.edu)  
Signature Date: 2019-04-19 - 6:45:41 PM GMT - Time Source: server- IP address: 198.99.91.32
-  Document viewed by Kim Kuster Dale (kim.dale@wncc.edu)  
2019-04-23 - 5:42:30 PM GMT- IP address: 97.118.36.77
-  Document e-signed by Kim Kuster Dale (kim.dale@wncc.edu)  
Signature Date: 2019-04-23 - 5:43:02 PM GMT - Time Source: server- IP address: 97.118.36.77
-  Document viewed by Kristine Sudbeck (ksudbeck@thenicc.edu)  
2019-05-16 - 8:46:29 PM GMT- IP address: 64.89.54.50
-  Document e-signed by Kristine Sudbeck (ksudbeck@thenicc.edu)  
Signature Date: 2019-05-16 - 8:49:01 PM GMT - Time Source: server- IP address: 64.89.54.50
-  Signed document emailed to Kim Kuster Dale (kim.dale@wncc.edu), Kristine Sudbeck (ksudbeck@thenicc.edu), Tara Naughtin (naughtint@mpcc.edu), Manoj Patil (manoj.patil@littlepriest.edu), and 5 more  
2019-05-16 - 8:49:01 PM GMT