

## WTCS Repository

# 10-806-154 General Physics 1

## Course Outcome Summary

### Course Information

**Description** Presents the applications and theory of basic physics principles. This course emphasizes problem-solving, laboratory investigation, and applications. Topics include unit conversion and analysis, vectors, translational and rotational kinematics, translational and rotational dynamics, heat and temperature, and harmonic motion and waves.

**Total Credits** 4.00

### Pre/Corequisites

**Prerequisite** Each Wisconsin Technical College determines the General Education course prerequisites used by their academic institution. If prerequisites for a course are determined to be appropriate, the final Course Outcome Summary must identify the prerequisites approved for use by the individual Technical College.

### Course Competencies

#### 1. Solve problems involving unit conversion and unit analysis.

##### Assessment Strategies

- 1.1. with the use of a scientific calculator.
- 1.2. through completion of homework.
- 1.3. through completion of quizzes/exams.
- 1.4. through completion of lab activities.

##### Criteria

*Your performance will be successful when:*

- 1.1. you use the conversion factor method to make correct conversions.
- 1.2. you show the steps used to solve the problem.
- 1.3. you include correct units of measure in your answer.

#### 2. Perform vector analysis.

##### Assessment Strategies

- 2.1. with the use of a scientific calculator.
- 2.2. through completion of homework.
- 2.3. through completion of quizzes/exams.
- 2.4. through completion of lab activities.

##### Criteria

*Your performance will be successful when:*

- 2.1. you successfully add and subtract vectors using component method.
- 2.2. you successfully convert between rectangular and polar form.
- 2.3. you show the steps used to solve the problem.
- 2.4. you include correct units of measure in your answer.

### **3. Apply the laws of translational kinematics.**

#### **Assessment Strategies**

- 3.1. with the use of a scientific calculator.
- 3.2. through completion of homework.
- 3.3. through completion of quizzes/exams.
- 3.4. through completion of lab activities.

#### **Criteria**

*Your performance will be successful when:*

- 3.1. you correctly solve problems involving displacement, velocity, acceleration, and time.
- 3.2. you show the steps used to solve the problem.
- 3.3. you include correct units of measure in your answer.

### **4. Apply the laws of translational dynamics.**

#### **Assessment Strategies**

- 4.1. with the use of a scientific calculator.
- 4.2. through completion of homework.
- 4.3. through completion of quizzes/exams.
- 4.4. through completion of lab activities.

#### **Criteria**

*Your performance will be successful when:*

- 4.1. you draw an accurate freebody or motion diagram representing the problem.
- 4.2. you use the freebody diagram to solve for unknowns.
- 4.3. you correctly solve uniform circular motion problems .
- 4.4. you show the steps used to solve the problem.
- 4.5. you include correct units of measure in your answer.

### **5. Solve problems using concepts of work, energy, and power.**

#### **Assessment Strategies**

- 5.1. with the use of a scientific calculator.
- 5.2. through completion of homework.
- 5.3. through completion of quizzes/exams.
- 5.4. through completion of lab activities.

#### **Criteria**

*Your performance will be successful when:*

- 5.1. you accurately calculate work.
- 5.2. you accurately calculate power.
- 5.3. you accurately calculate kinetic energy.
- 5.4. you accurately calculate potential energy.
- 5.5. you correctly solve problems using the law of conservation of energy.
- 5.6. you show the steps used to solve the problem.
- 5.7. you include correct units of measure in your answer.

### **6. Solve problems based on the principle of conservation of momentum.**

#### **Assessment Strategies**

- 6.1. with the use of a scientific calculator.
- 6.2. through completion of homework.
- 6.3. through completion of quizzes/exams.
- 6.4. through completion of lab activities.

#### **Criteria**

*Your performance will be successful when:*

- 6.1. you accurately calculate momentum.
- 6.2. you correctly solve problems using the law of conservation of momentum.

- 6.3. you show the steps used to solve the problem.
- 6.4. you include correct units of measure in your answer.

## **7. Apply the laws of rotational kinematics.**

### **Assessment Strategies**

- 7.1. with the use of a scientific calculator.
- 7.2. through completion of homework.
- 7.3. through completion of quizzes/exams.
- 7.4. through completion of lab activities.

### **Criteria**

*Your performance will be successful when:*

- 7.1. you correctly solve problems involving angular displacement, angular velocity, angular acceleration, and time.
- 7.2. you show the steps used to solve the problem.
- 7.3. you include correct units of measure in your answer.

## **8. Apply the laws of rotational dynamics.**

### **Assessment Strategies**

- 8.1. with the use of a scientific calculator.
- 8.2. through completion of homework.
- 8.3. through completion of quizzes/exams.
- 8.4. through completion of lab activities.

### **Criteria**

*Your performance will be successful when:*

- 8.1. you draw an accurate freebody or motion diagram representing the problem.
- 8.2. you use the freebody diagram to solve for unknowns.
- 8.3. you accurately calculate moment of inertia.
- 8.4. you accurately calculate rotational kinetic energy.
- 8.5. you accurately calculate work.
- 8.6. you accurately calculate power.
- 8.7. you correctly solve problems using the law of conservation of energy.
- 8.8. you show the steps used to solve the problem.
- 8.9. you include correct units of measure in your answer.

## **9. Solve problems involving properties of solids and fluids.**

### **Assessment Strategies**

- 9.1. with the use of a scientific calculator.
- 9.2. through completion of homework.
- 9.3. through completion of quizzes/exams.
- 9.4. through completion of lab activities.

### **Criteria**

*Your performance will be successful when:*

- 9.1. you accurately calculate pressure.
- 9.2. you correctly apply Archimedes' Principle.
- 9.3. you correctly solve problems in fluid dynamics.
- 9.4. you correctly solve problems involving the deformation of solids.

## **10. Solve problems involving heat and temperature.**

### **Assessment Strategies**

- 10.1. with the use of a scientific calculator.
- 10.2. through completion of homework.
- 10.3. through completion of quizzes/exams.
- 10.4. through completion of lab activities.

## Criteria

*Your performance will be successful when:*

- 10.1. you accurately complete temperature conversion problems.
- 10.2. you accurately solve problems related to specific heat and latent heat.
- 10.3. you accurately solve problems related to heat transfer.
- 10.4. you accurately solve problems related to the gas laws.
- 10.5. you accurately solve problems related to thermal expansion.
- 10.6. you solve problems involving the First Law of Thermodynamics.

## 11. Solve problems involving simple harmonic motion and waves.

### Assessment Strategies

- 11.1. with the use of a scientific calculator.
- 11.2. through completion of homework.
- 11.3. through completion of quizzes/exams.
- 11.4. through completion of lab activities.

## Criteria

*Your performance will be successful when:*

- 11.1. you accurately solve problems related to simple harmonic motion.
- 11.2. you accurately solve problems involving frequency, amplitude, wavelengths, and wave speed.
- 11.3. you describe interference and resonance.
- 11.4. you correctly solve problems involving sound intensity levels.
- 11.5. you correctly solve problems using the doppler effect.