Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department – see course syllabus available from instructor.

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<th>PHYS 111</th>
<th>Physics</th>
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<td>COURSE NAME/NUMBER</td>
<td>FACULTY/DEPARTMENT</td>
<td>UCFV CREDITS</td>
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<td>Mechanics</td>
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**CALENDAR DESCRIPTION:**

This course is intended for students who are planning to study engineering science, or life sciences. Topics covered include: vectors, kinematics, dynamics, work and energy, collisions, rotational kinematics, rotational dynamics, simple harmonic motion, and gravitation. The object is to understand the fundamental laws of mechanics, to learn how to apply the theory to solve related problems, and to develop a feeling for the order of magnitude of physical quantities in real experiments.

**NOTE:** Students cannot take PHYS 100 or PHYS 101 for further credit.

**PREREQUISITES:**

Physics 11 or PHYS 083 or PHYS 100; Physics 12 recommended.

**COREQUISITES:**

MATH 111 (Calculus). Note: Students with BC Calculus 12, IB Math 12, or AP Calculus 12 A or B should contact instructor or department head for permission to register.

**SYNONYMOUS COURSE(S):**

(a) Replaces: 
(b) Cross-listed with: 
(c) Cannot take: PHYS 100 or PHYS 101 for further credit.

**SERVICE COURSE TO:**  
Bachelor of Science

**TOTAL HOURS PER TERM:** 105

**TRAINING DAY-BASED INSTRUCTION:**

Length of course:  
Hours per day:  

**OTHER:**

Maximum enrolment: 36  
Expected frequency of course offerings: Annually  
(every semester, annually, every other year, etc.)

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)  
Yes ☐ No ☒

WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)  
Yes ☐ No ☒

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:  
Yes ☒ No ☐

Course designer(s): G. McGuire; revised T. Cooper  
Date approved: October 16, 2008

Department Head: T. Cooper; revised P. Mulhern  
Date of meeting: September 26, 2008

Supporting area consultation (UPACA1)  
Date approved: October 3, 2008

Curriculum Committee chair: T. Cooper; G. Schlitt  
Date approved: November 3, 2008

Dean/Associate VP: W. Gordon  
Date of meeting: November 21, 2008

Undergraduate Program Advisory Committee (UPAC) approval
LEARNING OUTCOMES:
This course is designed for students to use a calculus-based approach to solve physics problems as they apply to science, engineering, and the life sciences. Upon successful completion of this course, students will:
1. Understand the fundamental laws of mechanics and how to apply the theory to solve related problems.
2. Be able to apply physics principles to everyday situations and phenomena in life sciences and engineering.
3. Be able to perform fundamental laboratory experiments, and interpret the data obtained.
4. Have developed a feeling for the order of magnitude of physical quantities in real experiments.

METHODS: (Guest lecturers, presentations, online instruction, field trips, etc.)
This course will be presented using lectures and laboratory experiments. Films or other audio-visual aids will be used where appropriate. Problems will be assigned on a regular basis, which are to be handed in and marked. Problems that require the use of calculus will be emphasized. Close coordination will be maintained between laboratory and classroom work. Computer-assisted learning programs will be used to increase the understanding of the concepts being studied.

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):
☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)
☑ Other (specify): Course challenge plus evidence of having appropriate laboratory skills
☐ PLAR cannot be awarded for this course for the following reason(s):

TEXTBOOKS, REFERENCES, MATERIALS: [Textbook selection varies by instructor. An example of texts might be:]

REFERENCES:

SUPPLIES / MATERIALS:

STUDENT EVALUATION: [An example of student evaluation for this course might be:]
Assignments 20%
Mid-term 25%
Laboratory work 15%
Final exam 40%

COURSE CONTENT: [Course content varies by instructor. An example of course content might be:]
Introduction to course: relationship of lecture, tutorials, and laboratories; units and dimensional analysis
Vectors: vector and scalar quantities, addition, resultant of several vectors, unit vector, dot and cross product
Kinematics of a Particle: speed and velocity, relative velocity, average velocity, acceleration, rectilinear motion with constant acceleration, projectiles
Dynamics of a Particle: Newton's laws of motion and applications, friction and motion on an incline
Momentum: definition, linear momentum, conservation of momentum, impulse
Work, Energy, and Power: work, kinetic energy, gravitational potential energy, elastic potential energy, equivalence of mass and energy, power
Conservation of Energy: collisions, types of collisions, conservation of total energy, mechanical energy
Rotational Kinematics: angular quantities, angular speed and velocity, angular acceleration, tangential quantities, radial acceleration, centripetal force
Rotational Dynamics: kinematics of pure rotation, centre of mass, torque and rotational inertia, angular momentum, conservation of angular momentum
Gravitation: law of gravitation, gravitational force and weight, satellite motion, Kepler's laws
Periodic Motion: Hooke's law, simple harmonic motion, period, displacement, velocity and acceleration for SHM, pendulum and spring motion