

**SYLLABUS**

**Catalog course description:** (3-0) 3 credits. This is a first course in a two (2) semester calculus-level sequence, covering fundamental concepts of physics. This is the preferred sequence for student majoring in physical science and engineering. Topics include classical mechanics and thermodynamics. **SDSM&T course covers classical mechanics only.** Credit will not be allowed in both Phys 111-113 and Phys 211-213.

**Prerequisites:** MATH 123 or permission of instructor.

**Textbook:** **Fundamentals of Physics**, D. Halliday, R. Resnick, J. Walker, 8<sup>th</sup> Ed. Part 1  
**Class Time and Location:** **Monday, Wednesday, Friday 11:00 – 11:50 AM, in EEP 252**  
**Course Instructor:** Dr. Vladimir Sobolev  
**Office, office hours:** 222 EEP; M, W, 3:00 – 6:00 PM; T, Th 1:00 – 4:00 PM  
**Phone, E-mail:** 394-1225; vladimir.sobolev@sdsmt.edu

**Course materials web site:**

<http://www.hpcnet.org/sdsmt/directory/courses/2010sp/phys211/211AM001>

**!! Internet access is required for this course. All homework must be completed and will be graded on-line. Registration on the homework website is required.**

**Copy the URL <http://edugen.wiley.com/edugen/class/cls159683/> into the address line of your browser and immediately bookmark the login page, then select “Register”.**

**NOTE:** *Students with special needs or requiring special accommodations should contact the instructor, Dr. V. Sobolev, and/or the campus ADA coordinator, Jollie McCoy, at 394-1924 at the earliest opportunity.*

**Grade Structure:**

	Points		Grade	%
3 Hour Exams ( <i>and in class quizzes</i> )	200		A	85 – 100
Homework	180		B	84 – 70
Final Exam	170		C	69 – 55
TOTAL	550 ↔ 100 %		D	54 – 50
			F	49 – →

**The 90-min exams will cover material taught before the exam date:**

EXAM I	Monday, February 8	Starting at 12:00 a.m.
EXAM II	Monday, March 15	Starting at 12:00 a.m.
EXAM III	Friday, April 9	Starting at 12:00 a.m.

**All in class quizzes will be held in the room 252**

\*Quizzes *will not be announced beforehand* and **may be given during the lecture periods**. Students are responsible for taking the exams and quizzes when they scheduled. *Anyone missing an exam or quiz without prior approval and arrangement with Dr. Sobolev, or certifiable medical reasons, will be assigned a zero grade for the exam or quiz in question.* In class quizzes *will not be announced beforehand* and will be given during the lecture class. *Attendance of lectures is compulsory. Nonattendance of lecture classes will lead to significant reduction of the final grade.* The Final Exam will be a comprehensive exam on topics, which have received emphasis.

**Everyone must take the final exam.**

### **Course Philosophy and Objectives:**

The idea of this course is (1) to offer a logical presentation of the basic concepts and principles of mechanics, and (2) to strengthen an understanding of concepts and principles through a broad range of applications to the real world.

To meet this goal, the emphasis is placed on sound physical arguments, problem solving methodology as well as numerous examples of use of mechanics principles in contemporary technology, physical science and other disciplines, including engineering, chemistry, and medicine will be presented.

### **Upon completion of this course, students should demonstrate the ability to:**

1. Use SI units and convert units from one system to another.
2. Perform basic operations on vectors such as adding and subtracting vectors geometrically and by components in the unit-vector notation; converting components into polar coordinates; multiplying a vector by a scalar and performing the dot and cross multiplication of vectors.
3. Calculate displacement, average and instantaneous velocity and acceleration of a particle given its position vector; describe projectile motion and uniform circular motion; relate velocities in different frames of reference.
4. Use the free-body diagrams in solving dynamics problems; apply Newton's laws to a system of several interacting bodies in order to find their accelerations.
5. Calculate work done by a constant or general variable force; calculate power given the force and instant velocity; use the work-energy theorem to relate a change in kinetic energy to the net work done on a system.
6. Calculate gravitational and elastic potential energy; apply energy conservation principle to systems involving gravity, springs, and friction.
7. Find the center of mass of a system of several particles; apply Newton's second law to a system of particles in order to relate the net external force and the acceleration of the system's center of mass.
8. Use conservation of linear momentum and of energy to relate velocities of colliding bodies before and after collision for the cases of elastic and purely inelastic collisions in one and two dimensions.
9. Calculate angular displacement, velocity and acceleration; relate angular and linear variables; calculate rotational kinetic energy; use the parallel-axis theorem to find the rotational inertia of a body; calculate torque; apply the Newton's second law in angular form to relate the net torque and the angular acceleration.

*Students are expected to spend a minimum of six hours per week studying for every three hours spent in class. Students who spend the minimum time studying usually get the minimum grade.*

**GenEd Goal #6:** *Students will understand the fundamental principles of the natural sciences and apply scientific methods of inquiry to investigate the natural world.*

**Student Learning Outcomes:** As a result of taking courses meeting this goal, students will:

1. Demonstrate the scientific method in a laboratory experience. This outcome will be achieved and assessed in Phys 213L course.

2. Gather and critically evaluate data using scientific method.

**Assessment:** Students will be able to critically evaluate data (given or obtained) with proper accuracy using appropriate laws and formulas of classical mechanics for scientifically sound presentation of laboratory reports, homework assignments, and of solutions on quizzes and exams.

3. Identify and explain the basic concepts, terminology and theories of selected natural sciences.

**Assessment:** Students will be able to identify and apply basic concepts and appropriate laws of classical mechanics in order to solve assigned problems in homework, quizzes, exams, and in oral presentation.

4. Apply selected natural science concepts and theories to contemporary issues.

**Assessment:** Students will be able to explain how physics concepts, laws, and phenomena relate to contemporary engineering and science in classroom discussions and written assignments.

**Freedom in learning.** Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the dean of the college which offers the class to initiate a review of the evaluation.

## **POLICIES**

1. **All homework must be completed and will be graded on-line.** The homework will be graded for your weekly score; no late homework will be accepted.
2. **Normally, all three 90-min exams will be taken on-line. A single 24-hour time window will be given to start and complete the exam. Once started the exam must be completed in 90 min. Only one attempt will be allowed for the completion of each problem and only one exam session will be allowed. The exam will close at the end of the 24-hour period.**
3. The final exam will have only multiple-choice questions and will be taken in class on paper.
4. All homework and class participation points, after normalization will total your instructor's evaluation score (up to 180 points maximum).
5. **All exams, including the final, are open book. Only the standard course textbook is allowed. Student prepared note cards and sheets are not permitted. Calculators are permitted.**
6. **The final exam will be comprehensive with some emphasis on material covered after Exam III.**

7. Any violation of the academic integrity policy, such as **cheating and plagiarism**, will not be tolerated in this course. Penalties may range from a failing grade for the work in question to failure in the course.

**Academic misconduct:** Any violation of academic integrity policy, such as cheating and plagiarism, will not be tolerated in this course. Penalties may range from a failing grade for the work in question to failure of the course.

### Tentative Lecture Topic Schedule

WEEK OF	MONDAY	WEDNESDAY	FRIDAY
January 11 – 15		<i>Registration</i>	Chapter 1, 2
January 18 – 22	<i>Holiday</i>	Chapter 2	Chapter 2
January 25 – 29	Chapter 2, 3	Chapters 3	Chapter 4
February 1 – 5	Chapter 4	Chapter 4	Chapter 4
February 8 – 12	Chapter 4 ( <b>Exam I</b> )	Chapter 5	Chapter 5
February 15 – 19	<i>Holiday</i>	Chapter 5	Chapter 5
February 22 – 26	Chapter 5	Chapter 6	Chapter 6
March 1 – 5	Chapters 6	Chapter 6	Chapter 6
March 8 – 12	<i>Spring Break Spring Break</i>		
March 15 – 19	Chapter 7 ( <b>Exam II</b> )	Chapter 7	Chapter 7
March 22 – 26	Chapter 7	Chapter 7	Chapter 8
March 29 – April 2	Chapter 8	Chapter 8	<i>Holiday</i>
April 5 – 9	<i>Holiday</i>	Chapter 8	Chapter 9 ( <b>Exam III</b> )
April 12 – 16	Chapter 9	Chapter 9	Chapter 9
April 19 – 23	Chapter 10	Chapter 10	Chapter 10
April 26 – 30	Chapter 11	Chapters 11	Chapter 11
May 3 – 7	<b>FINALS WEEK</b>	<b>FINALS WEEK</b>	<b>FINALS WEEK</b>

***Final exam* May 4, at 8:00 - 9:50 a.m. in the room EEP 252**