NAU NORTHERN ARIZONA UNIVERSITY

Course Title: PHY 199 Special Topics
Term: Winter 2023
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

Special topics related with basic physics will be discussed in this course with calculus-based knowledge. Emphasis will be placed on the basic concepts and principles of physics, including motion, vectors, Newton's laws, forces, energy, solids, fluids, thermal physics, etc. Students will gain a good understanding of the concepts learnt and apply them to solve physical problems in real life after successfully completing the course.

Course Prerequisites:

MAT 136 Calculus I

Learning Outcomes:

By the end of the course, the student should be able to:

A. Gain insights into the key concepts and disciplines of basic physics;

B. Describe and explain natural phenomena using the basic concepts and laws;

C. Master the commonly used research methods in physics;

D. Interpret the results of simple experiments and demonstrations of physical principles;

E. Solve a variety of basic problems in particle kinematics and dynamics using Newton's Laws of Motion and the conservation laws of energy and momentum.

Course Material:

Raymond A. Serway, Chris Vuille, Jerry S. Faughn, ***College Physics***, 9th Edition, Cengage Learning, 2009.

Evaluation:

- 4 Labs [20%]
- Lab Report [15%]
- Mid-term Exam [30%]
- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

Week 1

1	Course Overview Standards of Length, Mass and Time
2	Problem-Solving Strategy
3	Motion in One Dimension
4	Vectors and Their Properties Component of a Vector

5	Two-Dimensional Motion The Laws of Motion **Lab 1: Motion**

Week 2

6	Forces
7	Newton's First Law Newton's Second Law Newton's Third Law
8	Energy
9	Energy (Cont.)
10	Momentum and Collisions **Lab 2: Forces**

Week 3

11	**Mid-term Exam**
12	Rotational Motion and the Law of Gravity
13	Newtonian Gravitation
14	Rotational Equilibrium and Rotational Dynamics
15	Solids and Fluids **Lab 3: Newtonian Gravitation**

Week 4

16	Thermodynamics
17	Energy Transfer
18	The Kinetic Theory of Gases
19	Energy in Thermal Processes
20	Heat and Internal Energy **Lab 4: Energy Transfer**

Week 5

21	Thermal Physics

22	Global Warming and Greenhouse Gases
23	Thermal Processes
24	Human Metabolism **Lab Report**
25	**Final Exam**