PHYS 701: CLASSICAL MECHANICS

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1. Course Objectives:

The purpose of the course is to introduce students to theoretical problems of classical mechanics and to develop the understanding of Lagrangian and Hamiltonian formalisms.

Upon completion of the course, the student should be able to understand basic ideas of:

- motion in central potential.
- small oscillations.
- kinematics and dynamics of rigid bodies.
- energy and angular momentum of rotating bodies.
- Lagrange equations.
- Hamilton's equations.

Successful students should be able to:

- solve problems involving collisions of mechanical; motion in accelerating reference frames, static equilibrium problems;
- calculate Lagrangians for mechanical systems;
- use rotation matrices and Euler angles for description of motion of the rigid body;
- understand classical motion in the central field.

2. Required textbook: "Classical Mechanics" by H. Goldstein.

3. Instructional delivery strategy: The course will be taught using lectures followed up by homework assignments and periodic tests. Discussions of course topics during lectures are encouraged.

4. Course Requirements and Grading scheme:

- Your overall score will be an average of all grades you have accumulated during the course, weighted as follows:
    - Quizzes: 30%
    - Homework: 30%
    - Final Examination: 40%
- Exams will be based on the material discussed in class, the material in homework assignments, the material in quizzes, and textbook.
- Grading scale: A:88-100 B:76-87 C:63-75 D:50-62.

5. Topical outline of content to be covered:

- Newton's laws. (week 1)
- Systems with constraints. Lagrange equations. (week 2-3)
- Motion in central potential. (week 4-5)
- Kinematics of rigid bodies.(week 6-7)
- Energy and angular momentum of rotating bodies. Tensor of inertia. (week 8)
- Dynamics of the rigid body rotational motion. Euler equations of motion. (week 9-10)
- Small oscillations. (week 10-11)
- Motion in the rotating reference frames. (week 12)
- Hamilton's equations. (week 13-14)

6. Attendance policy:

Students are expected to attend each scheduled class meeting, to be on time, and to be prepared for each class session. The University attendance policy specifies that students may miss up to 3 class meetings (10% of class time) without penalty. The 4th absence will result in a grade penalty of one letter grade. The 5th absence will result in a deduction of 2 letter grades. Quizzes and homework cannot be made up except in the case of extreme illness or loss.

7. Any student with a documented disability should contact the Office of Student Disability Services at 803-777-6142 to make arrangements for appropriate accommodations.