PHYC54 -- Classical Mechanics

University of Toronto (UTSC)- Fall 2014

Lecturer:

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Lectures

WE	11:00	13:00	BV 261
MO	11:00	13:00	MW 262

Office Hours:

Monday and Wednesday, 1:00-2:00 PM, or by appointment.

Books:

There exist a number of good textbooks that covers the materials thoroughly. However, we recommend the same book, you used in PHYB54 by John Taylor, and we will follow closely. You can, otherwise, choose any other book as far as it covers the same topics. There are other books that you may consult from time to time. We will provide lecture notes when is required.

Suggested textbooks: (One of)

"Classical Mechanics", **John R. Taylor (University Science Books, 2005)**

"Classical Dynamics of Particles and Systems", Thornton and Marion, **(Holt Rinehart& Winston)**

Additional reading material:

Mechanics, Landau and Lifshitz

Classical Mechanics, A Modern Prospective, Barger and Olsson

Classical Mechanics, Goldstein

Theoretical Mechanics of Particles and Continua, Fetter and Walecka

Mathematical Methods for Physicists**, Arfken and Weber

Evaluation: This is a tentative grading scheme, which will be discussed and confirmed with students in class:
Homework: 20%
Mid-term Test: 20% (10% each)
Quizzes: 10% (5% each)
Project: 10%
Final: 40%

Homework will be assigned (almost) every week or two (6 in total) and will be **due one week that day at the beginning of the Lecture**. Generally, **you can discuss** the homework with your colleagues but what you **submit must your own work**. Please check the UTSC regulation on this matter. Late homework submission will be **penalized by 25% for each day** after the due date and will not be accepted after two days. There is no make up test or quiz, however, if a student misses a test, for reasons acceptable by the university regulations, then the test grade will be added to the final grade.

There will be one (or two) midterm each will be a 1 to 1.5 hours exams. The date and format of the test will be discussed in class. Quizzes will be administered in class. The final exam will be cumulative and during the examination period in January. The project will be discussed in class and more information will be provided later on.

Course Structure

Lectures and homework will be the most important parts of the class. Try to follow the derivations during the lecture closely and stop me when something is not clear. The homework will take a substantial amount of time, however it is important that you start working on the homework on your own before discussing with your colleagues.

Topics covered during the course include (time permits) the following:

Chapter 1-4: Review of basic concepts you learned in your first and second year, which includes: Newtonian's formalism of classical mechanics, Conservation of energy, conservation of momentum and conservation of angular momentum.

Chapter 6: Calculus of variation

Chapter 7: Lagrangian formalism

Chapter 13: Hamiltonian Mechanics

Chapter 8: Two-Body Central Force

Chapter 9: Mechanics in Non-inertial Frames

Chapter 10: Rotational motion of Rigid Bodies

Mathematical concepts (you will need):

Functional calculus

Second order differential equations

Taylor expansion

Eigenvectors and Eigenvalues

GOOD LUCK