PHYS-330

Introduction to Classical Mechanics

This is a working document, the most current version will always be posted on the course website

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Office Hours:

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Tues 12:30-2pm
Weds 11:30-2pm
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note: Email is the best way to contact me. If I do not reply to an email within 24 hours, please re-send the email. RIT's system is not fool proof and sometimes your messages get filed into my spam folder.

Textbook: Classical Mechanics, by John R. Taylor

Prerequisites: (MATH-219 or MATH-221) and MATH-231 and (PHYS-209 or PHYS-212 or PHYS-217). Students in the PHYS-BS program are also required to complete PHYS-275 prior to taking this course.

Co-requisites: PHYS-320 or equivalent course

Suggested Requisite: PHYS-225

Course Description: Nonrelativistic ($c \to \infty$) classical mechanics studies the behaviour of statistically small ($\ll 10^{23}$) number of particles, rigid bodies, fluids and plasmas when quantum effects are negligible ($\hbar \to 0$). We start off with a brief but rigorous tour of Newtonian mechanics. After that we formally develop conservation laws, connexions with symmetry, central forces using Lagrangian mechanics, dynamics in non-inertial frames, variational principles, and Hamiltonian dynamics.

Class Location(s):

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MW  10:10am - 11:05am (CAR)-1235
T   11:00am - 11:55am (07b)-4202
TH  11:00am - 11:55am  (01)-3381
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Exams

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Midterm 1 - Tues Week 6
Midterm 2 - Tues Week 12
Final Exam - 18 December
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Midterm format: (tentatively) Both midterms will consist of 5 problems of which you have to answer 3 in class. The remaining 2 problems are handed in to me the next day in class.

Final Exam format: (tentatively) complete 5 of 7 questions in the allotted time. Hand remaining problems to me by 5pm the same day.

Midterms and Final Exam will be open book and open notes.

Homework

You will have approximately 1 homework assignment per week. You will have one week to complete. Collaborative effort is encouraged, however, everyone should hand in their own work. Work which appears to be copied will be given zero.

You will have some questions requiring computational work. You are encouraged to use jupyter notebooks and the jupyterhub at: https://solis.main.ad.rit.edu

You will require a GitHub (www.GitHub.com) to login to the jupyterhub. When you have set up a GitHub id please email your id and I will add you to the access list.

If you prefer you, you can use the Anaconda package which contains a jupyter notebook environment.

Grading for homework will be as follows (per problem):

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0   - problem not attempted or completely incorrect method
3   - major logical errors, omissions or mathematical mistakes.
4   - minor mathematical mistakes
5   - mostly correct

Detailed critiques will not be provided.
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Assessment:

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Homework (less lowest 2)..... 25%
Midterms ..................... 25% * 2 = 50%
Final Exam ................... 25%

Final exam score will replace, if advantageous to you,
the lower of the two midterm scores.
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Informal Outline:

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Weeks 1-5: Chapters 1-5 of book, some mathematical methods
Weeks 6-10: Chapters 6,7,8, 11 of book
Weeks 11-14: Chapters 9, 10, 13

The above outline is subject to change.
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Grading Scheme

Following the School of Physics and Astronomy scheme here is the approximate grade Scheme: A (type) - 90 or greater
B (type) - 80 - 90
C (type) - 70 - 79
D - 60 - 69
F - less than 60