

## **ANALYTICAL MECHANICS I (PHY 300, credits: 3) 2018F**

Instructor: Prof. Bogdan Dabrowski, Physics Department, NIU, [bdabrowski@niu.edu](mailto:bdabrowski@niu.edu). You can find me in my office (La Tourette Hall 216) or in my labs La Tourette Hall 215 and FR 110 (phone: 753-6472) on Mondays, Tuesdays, Wednesdays and Fridays. You can also reach me on Thursdays at Argonne National Laboratory (phone: 630-252-5541) or at email [dabrowski@anl.gov](mailto:dabrowski@anl.gov).

Course meeting time and place: 12:00 – 12:50 PM on MWF at La Tourette 227.

Office hours: on Wednesdays and Fridays from 11:00 to 11:59 AM at La Tourette Hall 216.

The required textbook: *Classical Mechanics*—John R. Taylor—ISBN-10: 189138922X; ISBN-13: 978-1891389221.

### Chapters and topics we will study:

Ch. 1.1 – 1.7: Newton's Laws of Motion (3 classes)

Ch. 2.1 – 2.7: Projectile Motion (3 classes)

Ch. 3.1 – 3.5: Momentum and Angular Momentum (2 classes)

Ch. 4.1 – 4.10: Energy, Work and Force (5 classes)

First midterm (1 class)

Ch. 5.1 – 5.9: Harmonic Oscillations (5 classes)

Ch. 6.1 – 6.4: Calculus of Variations (2 classes)

Ch. 7.1 - 7.7: **Lagrange's Equations** (3 classes)

Ch. 8.1 – 8.8: Central Force Problems (4 classes)

Second Midterm (1 class)

Ch. 9.1 – 9.10: Mechanics in Noninertial Frames (5 classes)

Ch. 10.1 – 10.5: Rotation of Rigid Bodies (3 classes)

Ch. 11.1 – 11.7: **Eigenvalue Problem:** Coupled Oscillations and Normal Modes (4 classes)

Catch up/Review (1 class)

Final Exam

There will be several problems solved in class for every chapter we study. Additional problems will be assigned as homework every week. I will collect and grade these problems the following week – there is no substitute for solving problems on your own. Your work must be based on honesty. The attempt of any student to present as his or her own work that which he or she has not produced will be regarded as a serious offense.

There will be two closed-books mid-term exams and a final comprehensive exam.

The grades will be based on the total amount of points you would accumulate during the course (homework 30%, two mid-term exams, each 20%, and final exam 30%):

A (4.00) 90 – 100%

A- (3.67) 80 – 89 %

B+ (3.33) 72 – 79%

B (3.00) 64 – 71%

B- (2.67) 56 - 63%

C+ (2.33) 48 – 55%

C (2.00) 40 – 47%

D (1.00) 32 – 39%

F (0.00) 31% or less

Attendance: Attendance not be taken, but you can't hand in homework without being in class, and you will not do well if you do not follow the coursework. If you want to hand in homework and you are not able to attend class, it must be handed in early, not late.

Food in the classroom: Food and drink are not allowed in the classroom. If this causes trouble or difficulty, please speak to the instructors to work out an appropriate arrangement.

Phones and electronics: If your phone rings, we will know that it was you (this is a small class)! And if you are using your phone in class, we will see you, and will call you out on it.

Disability statement: If you need an accommodation for this class, please contact the Disability Resource Center as soon as possible. The DRC coordinates accommodations for students with disabilities. It is located on the 4th floor of the Health Services Building, and can be reached at 815-753-1303 or [drc@niu.edu](mailto:drc@niu.edu).

Also, please contact me privately as soon as possible so we can discuss your accommodations. Please note that you will not be required to disclose your disability, only your accommodations. The sooner you let me know your needs, the sooner I can assist you in achieving your learning goals in this course.