Syllabus

Course: Physics 15a, Advanced Introductory Physics I

Instructor: David H. Roberts
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Office Hours: M 2-3, W 3-4, TH 4-5, & by appointment (via email, please)

Class Hours: Block E (MWTh 12-1) & Block X1 (M 6:30-9:30, for exams & recitations, every week)

Classroom: TBD

Text: Kleppner & Kolenkow, An Introduction to Mechanics (2nd Ed.)
Supplement: Boas, Mathematical Methods in the Physical Sciences

This is a course in classical mechanics, covering much the same material as Physics 11a but at a more sophisticated level in both physics and mathematics.

We will cover topics such as kinematics, dynamical laws of motion, the conservation of momentum, energy, and angular momentum, and rigid body motion in their Newtonian formulations.

Special topics to be included are the harmonic oscillator, the pendulum, the laws of planetary motion and exo-planets, methods of solution for homogeneous and inhomogeneous linear differential equations of first and second order, and the use of the program Mathematica. We will also do selected topics from the first few chapters of Boas’s text, which is a book you will find useful your entire four years at Brandeis.

This course is intended for students with excellent preparation in both physics and mathematics. Differential and integral calculus will be used without explanation from day one; if you have had either form of AP calculus you should be OK, even if you are enrolled in Math 10b. Vector and multi-variable calculus will be introduced during the semester.

A special feature of this course is that problem sets will be done in small groups and the solutions presented to the class by the students during the Monday evening recitations. The exact form this will take will depend on the final class size.

1Subject to revision. Any changes will be posted and announced via LATTE. Version of 03 August 2015.