

ANALYTICAL MECHANICS

WINTER 2012

January 16 Action principles

January 18 How to solve the equations

January 20, 23 Lagrangians

January 25 Problem session: problems 1:1,2,4,6,7, 2:2,3,4.

February 27, 30 The two body problem

February 1 Problem session: problems 2:5,6,7, 3:1, 4:1,2,4.

February 6 Small oscillations

February 8 Rotations

February 13 Problem session: 5:4,5, 6:1 + leftovers

February 20,22 Rigid bodies

February 23 (at 13.15) Problem session: problems 6:3,4,8,9.

February 27 The Hamilton equations of motion

February 29 Legendre transformations, tensors

March 1 Problem session: problems 7:1, 8:1,2,3,6.

March 5, 7 Symplectic geometry and Poisson brackets.

March 8 Problem session: problems 8:5,7,8,9,10.

March 12 Demonstrations of chaotic systems (Natallia Karpenka).

March 14 Backtrack.

March 16 Exam, 9-15 in FR4.

There are lectures notes covering everything I talk about (and a little bit more), available on my home page. The relevant chapters in Goldstein et al are 2 – 6 and 8 – 9, with a very brief excursion into 10 – 12.

The lectures are in FB41, on Mondays at 10.15, Wednesdays at 15.15. and some Fridays at 8.15. On February 20 the location is FB42. The special case, February 23, is at 13.15.

There are seven possible grades, “excellent”, “very good”, “good”, “satisfactory”, “enough”, “not enough”, and “not even close”. There will be a total of 6 exercise classes. Each time you will be encouraged to hand in two of the solutions in advance; a total of eight flawless (handwritten) solutions will increase your grade by one step (unless you receive the grade “excellent” on the exam). However, the bonus points count *only* for the first exam.

The problems are those in my lecture notes. The bounus problems are: January 25 1:6 and 2:2, February 1 2:6 and 4:4, February 13 5:4 and 6:1, February 22 6:4 and 6:8, March 1 8:2 and 8:6, March 8 8:5 and 8:10.

“Kursforum”: Alvin Gavel, Anders Lundkvist, and David Andersson.

You are always welcome to my office, A5:1057, if you want to discuss analytical mechanics.