

SCHEDULE FOR FYSC14: HIGH ENERGY PHYSICS AND ACCELERATORS SPRING 2015 v2 March 18, 2015

This schedule and material can be found at:

<http://www.hep.lu.se/staff/christiansen/teaching/>

and is linked to from the official course homepage:

<http://www.utbildning.fysik.lu.se/tibet/template/personal%2CIndex.vm?pageid=241426&siteid=1000>

Compulsory elements:

Monday 23/3 13-15 (introduction)

Thursday 16/4 15-17 (lab-prep)

Monday 18/5 8-12 (lab-data analysis)

Lab period 2 (separate 2.5 hp grade)

Two written assignments to be handed in (25% of final 5 hp grade)

Oral exam (75% of final 5 hp grade): Thursday 28/5, Friday 29/5, Monday 1/6, and Tuesday 2/6.

All partial elements of the course: written assignment 1+2, lab, oral exam, DESY trip (Thursday 4/6 – Saturday 6/6) have to be passed for the course to be passed.

A final grade (U, G, VG) combining all grades and a percentage will be provided.

Monday 23/3 13-15 + Tuesday 24/3 15-17 (Peter+Else): Overview, four vectors, and Feynman diagrams

Suggested reading: chapter 1, section 7.3, chapter 1 and 2 of Leif's notes, A.1, A.2.

Suggested exercises: 1.2, 1.3, 1.6

Wednesday 25/3 13-15 (Peter): Leptons and the weak interaction

Suggested reading: chapter 2.

Suggested exercises: 2.1, 2.2, 2.4

Friday 27/3 10-12 (Peter): available in room L307

Friday 27/3 13-17 (Peter): Quarks and hadrons (13-15) and Accelerator course part 1 (15-17)

Exercise 1 is handed out/made available on the web.

Suggested reading: chapter 3.

Suggested exercises: 3.1, 3.2, 3.4

Suggested reading: chapter 4 + B.1, B.2, B.3 + course material at the web page.

Suggested exercises: 4.1, 4.2, 4.3

Monday 30/3 15-17 (Peter): Accelerator course part 2

Suggested reading and exercises: as for part 1.

Tuesday 31/3 13-15 + Wednesday 1/4 15-17 (Else): Detectors in high energy physics

Suggested reading: chapter 4.

Suggested exercises: 4.5, 4.7, 4.9

Easter break.

Tuesday 7/4 15-16 (Peter), 16-17 (Mats): Accelerator course part 3

Peter final lecture and Mats Lindroos about ESS.

Wednesday 8/4 13-14 (David), 14-15 (John): Accelerator course part 4

David McGinnis about RF instrumentation and John Weisend about cryotechnic for accelerators.

Thursday 9/4 10-12 (Else): available in room L307

Thursday 9/4 13-15 (Peter): the quark model

Suggested reading: chapter 6 (chapter 5 is not part of the curriculum).

Suggested exercises: 6.1, 6.2, 6.4 (6.4 is covered in class)

Friday 10/4 15-17 (Peter): QCD, jets and gluons

Suggested reading: chapter 7

Suggested exercises: 7.4, 7.7

Friday 10/4: exercise 1 has to be handed in.

Monday 13/4 13-15, Tuesday 14/4 13-15 (Else): Weak interactions: quarks and leptons

Suggested reading: chapter 8

Suggested exercises: 8.1, 8.2, 8.3 (8.2 and 8.3 goes together), 8.4, 8.5

Wednesday 15/4 13-15: exercise 1 is returned and exercises are explained.

Wednesday 15/4: exercise 2 is handed out and made available on the webpage.

Thursday 16/4 10-12 (Peter): available in room L307

Thursday 16/4 15-17: Compulsory lab introduction.

Friday 17/4 15-17 (Else): The Higgs

Monday 20/4 13-15 (Else): Electroweak Unification and gauge theory

Suggested reading: chapter 9

Tuesday 21/4 10-12 (Else): available in room L307

Tuesday 21/4 13-15 (Else): CP violation

Suggested reading: chapter 9 & 10

Suggested exercises: 10.1, 10.2, 10.3

Wednesday 22/4 13-15: Contingency

Lab period.

Wednesday 13/5: exercise 2 has to be handed in before 12:00 (lunch)

Monday 18/5 8-12: Compulsory lab analysis class.

Tuesday 19/5 13-15: exercise 2 is returned and exercises are explained.

Wednesday 20/5 15-17 and Thursday 21/5 13-15 (Else): Beyond the standard model and cosmology

Suggested reading: chapter 11 (11.1-11.4)

Friday 22/5 15-17 (Peter+Else): Summary and question session

A quiz and a test exam is organized.

Thursday 28/5, Friday 29/5, Monday 1/6, and Tuesday 2/6 2015: Oral exams

This is a compulsory element of the course and counts for 75% of the final score for the Particle Physics part.

Thursday 4/6 to Saturday 6/6 2015: DESY trip

This is a compulsory element of the course. Students that cannot make the trip will have to do a special written assignment on the research carried out at DESY