

SCHEDULE FOR FYSC14: HIGH ENERGY PHYSICS AND ACCELERATORS AUTUMN 2015 v1.1 October 29, 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 2/11 10-12 (introduction)

Monday 23/11 8-11 (lab-prep)

Monday 14/12 13-17 (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 7/1, Friday 8/1, Monday 11/1, and Tuesday 12/1.

All partial elements of the course: written assignment 1+2, lab, oral exam, DESY trip (Thursday 14/1 – Saturday 16/1) 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 2/11 10-12 + Tuesday 3/11 8-10 (Peter): 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 4/11 10-12 (Peter): Leptons and the weak interaction

Suggested reading: chapter 2.

Suggested exercises: 2.1, 2.2, 2.4

Wednesday 4/11 13-15: Peter is available in room L307

Thursday 5/11 8-10 (Peter): Quarks and hadrons

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

Suggested reading: chapter 3.

Suggested exercises: 3.1, 3.2, 3.4

Friday 6/11 8-10 (Peter): Accelerator course part 1

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 9/11 10-12 (Peter): Accelerator course part 2

Suggested reading and exercises: as for part 1.

Tuesday 10/11 8-9 (Peter), 9-10 (Mats): Accelerator course part 3

Peter final lecture and Mats Lindroos about ESS.

Wednesday 11/11 10-11 (David), 11-12 (John): Accelerator course part 4

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

Thursday 12/11 8-10 + Friday 13/11 10-12 (Caterina): Detectors in high energy physics

Suggested reading: chapter 4.

Suggested exercises: 4.5, 4.7, 4.9

Friday 13/11 13-15: Caterina available in room L307

Monday 16/11 10-12 (Caterina): 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)

Tuesday 17/11 8-10 (Caterina): QCD, jets and gluons

Suggested reading: chapter 7

Suggested exercises: 7.4, 7.7

Wednesday 18/11 10-12, Thursday 19/11 8-10 (Caterina): 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

Thursday 19/11: exercise 1 has to be handed in.

Thursday 19/11: exercise 2 is handed out and made available on the webpage.

Friday 20/11 8-10 (Caterina): Electroweak Unification and gauge theory

Suggested reading: chapter 9

Monday 23/11 8-11: Compulsory lab introduction.

Monday 23/11 13-15: Peter available in room L307

Tuesday 24/11 8-10: exercise 1 is returned and exercises are explained.

Tuesday 24/11 13-15: Caterina available in room L307

Lab period.

Thursday 10/12: exercise 2 has to be handed in before 12:00 (lunch)

Monday 14/12 10-12 (Caterina): The Higgs

Monday 14/12 13-17: Compulsory lab analysis class.

Tuesday 15/12 8-10: exercise 2 is returned and exercises are explained.

Tuesday 15/12 13-15: Peter is available in room L307

Wednesday 16/12 10-12 and Thursday 17/12 12-14 (Caterina): Beyond the standard model and cosmology

Suggested reading: chapter 11 (11.1-11.4)

Thursday 17/12 13-15: Caterina is available in room L307

Friday 18/12 8-10 (Peter+Caterina): Summary and question session

A quiz and a test exam is organized.

Thursday 7/1, Friday 8/1, Monday 11/1, and Tuesday 12/1 2016: Oral exams

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

Thursday 14/1 to Saturday 16/1 2016: 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