

## Week plan for course 02249 "Computationally Hard Problems", fall 2016 (preliminary)

### Tuesday, 30/08-2016 (week 1)

- Administrative issues
- Introduction to the course
- Formal languages, algorithmic problems
- Running times (deterministic and randomized)

Chapters 1-2.2 of the lecture notes are covered.

Exercise sheet 1 is handed out, including 1 **mandatory exercise**

### Tuesday, 06/09-2016 (week 2)

- Problems SAT and CLIQUE
- Decision problems vs. optimization problems
- Conversion between the two problem variants
- Definition and examples of randomized algorithms

Chapters 2.3-3.2 (3.2 only partly) of the lecture notes are covered.

Hand in (Monday night): solutions to mandatory exercise on sheet 1

Exercise sheet 2 is handed out, including 1 **mandatory exercise**

### Tuesday, 14/09-2016 (week 3)

Finish Chapter 3 of the lecture notes (randomized complexity classes etc.)

Hand in (Monday night): solutions to mandatory exercise on sheet 2

Exercise sheet 3 is handed out, including 1 **mandatory exercise**

### Tuesday, 20/09-2016 (week 4)

Chapter 4.1 of the lecture notes (the class NP)

Hand in (Monday night): solutions to mandatory exercise on sheet 3

Exercise sheet 4 is handed out, including 1 **mandatory exercise**

### Tuesday, 27/09-2016 (week 5)

NP-completeness proofs up to and including Theorem 4.19 in the lecture notes

Hand in (Monday night): Solutions to mandatory exercise on sheet 4

Exercise sheet 5 is handed out, including 1 **mandatory exercise**

### Tuesday, 04/10-2016 (week 6)

Lecture notes until the end of the proof of Theorem 4.25 (NP-completeness of VertexCover)

Hand in (Monday night): solutions to mandatory exercise on sheet 5

Exercise sheet 6 handed out, NO mandatory exercise

### Tuesday, 11/10-2016 (week 7)

Conclude Chapter 4 of lecture notes (NP-completeness + pseudopolynomial algorithms)

Project description (**mandatory** assignment) is handed out; working groups should be formed during the exercise session.

----- FALL BREAK -----

**Tuesday, 25/10-2016 (week 8)**

Chapters 5.1-5.3 of the lecture notes

Project work during the exercise sessions (no sheet handed out)

**Tuesday, 01/11-2016 (week 9)**

Chapter 5.4 of the lectures notes

Project work during the exercise sessions (no sheet handed out)

**Tuesday, 8/11-2016 (week 10)**

Chapter 5.5 and 5.6 of the lecture notes

Hand in (Monday night): solution to project

Exercise sheet 6 will be handed out, including 1 **mandatory exercise**

**Tuesday 15/11-2016 (week 11)**

Chapters 5.7 and partly 5.8 of the lecture notes

Hand in (Monday night): solutions for mandatory exercise on sheet 6

Exercise sheet 7 will be handed out, including 1 **mandatory exercise**

**Tuesday, 22/11-2016 (week 12)**

Chapters 5.8 and 5.9 of the lecture notes

Hand in (Monday night): solutions for mandatory exercise on sheet 7

**Tuesday, 29/11-2016 (week 13)**

Evaluation, wrap-up, discussion, exam preparation