

## 01325 Mathematics 4, Spring 2013

### Week no. 1

Welcome to the course 01325! Below I will provide some practical information about the course; please read the note carefully.

**Weekly notes:** Each week a Weekly Note, containing information about the program for the lectures and exercises will be posted on Campusnet. The note will often contain extra information, exercises, and hints to the home work, so I strongly suggest that you print it out.

**Teaching:** The course takes place Wednesdays 13:00-17:00. The lectures, 13:00-15:00, are given by Ole Christensen and take place in aud. 42 in Building 303. The lectures are followed by Exercise Sessions in Building 324, Room 020, 040, as well as the Foyer area 004 that is between the two rooms. The instructors are Berit Martensen, Gitte Fregerslev Schmidt, and Mads Sielemann Jakobsen.

**Course material:** We use the book

O. Christensen: Functions, Spaces, and Expansions, Birkhäuser 2010.

The book can be downloaded chapter by chapter from DTV Library. Alternatively, the hardcover version is sold in Polyteknisk Boghandel; the price is about 260 kr.

**Final exam:** The evaluation consists of two parts: a portfolio and a written 2-hours exam.

The portfolio is the collection of all home work during the semester. During the semester, you will have a chance to turn in 12 sets of home work: out of these, we will select the 10 best, and the score of the portfolio is based on these. You are welcome to work with your fellow students, but please supply their names on your home work sheet in that case. For the evaluation, the portfolio counts with the weight 25 % and the written exam with 75 %.

**Home work:** The home work has to be turned in no later than at

**15:15 o'clock on the day mentioned on the weekly note;**

either directly to the instructor, or in her/his box in "glasgangen" at the entrance of Department of Mathematics, Building 303.

**The deadline is taken seriously! Please always give your home work to the same instructor!**

The home work is supposed to be relatively short - it is primarily meant as a test that you have understood the key material from the problem session. There is no page limit, but we suggest that your home work does not exceed 4 pages.

The rest of this weekly note contains information about the first week of the semester.

**Theory:** In the week February 4 –February 8 the lectures cover

Sections 1.5–1.6 and 2.1. Read Sections 1.4 and 2.2 on your own.

As motivation for the content of the course we will also give a short introduction to topics treated in detail later, e.g., the Fourier transform and Shannon’s sampling theorem (Theorem 7.4.5 in the book).

The exercises will use some material from the book that is expected to be known - see in particular

Definition 1.2.1, Definition 1.2.4, Example 1.3.3.

**Exercises for the week February 4 –February 8:** 1.3, 1.8, 2.1, 2.3, 2.4\*, 2.5 (see definition 1.8.1), 1.4, Problem 9 from the file “Extra Exercises”.

A \* on an exercise means that it is more complicated than the average exercises.

**Hints to selected exercises:**

2.4\*(ii): Show that the functions  $f_N(x) := \sum_{k=1}^N \frac{1}{k^2} e^{ikx}$  in  $V$  converges to the function  $f(x) := \sum_{k=1}^{\infty} \frac{1}{k^2} e^{ikx}$  w.r.t.  $\|\cdot\|_{\infty}$  as  $N \rightarrow \infty$ .

**Homework 1, to be turned in no later than February 13:** 2.2 and Problem 1 from the file “Extra Exercises”.

Regards,

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