With this letter, we wish to welcome you to the Ph.D.course *Advanced Mathematics for Ph.D.-candidates in the Engineering Sciences: Analysis and Topology*, that takes place in October and November 2005.

Aims and Goals

A rough overview of the aims and goals for this course has previously been given in the course catalogue at

`http://auaw2.aua.auc.dk/fak-tekn/phd/kurser/j7.htm`,
see also,
`http://www.math.aau.dk/~fajstrup/UNDERVISNING/PHD/05/index.html`.

We were motivated to advertise this course by comments from several colleagues from the engineering sciences. They told us that quite a lot of Ph.D.-students fight with severe problems when reading papers in engineering journals because of the abundance of mathematical terms and references, and that it gets increasingly difficult to have the students own (even high quality) papers accepted for publication in these journals if the technical parts are not written in a proper mathematical language.

The main aim of this course is to facilitate your tackling these problems by giving you a background in basic terminology and useful results in the domain of *Global analysis*, a mathematical discipline heavily used in both physics and many branches of the engineering sciences. At the same time, we hope to convey to you some sense of mathematical rigour, that can often be helpful in sharpening your arguments in a research process and in a research paper, and thus to make its acceptance easier.

Needless to say that we will not be able to give you all the tools of a mathematical nature you will need now or later in your career. However, if you have some specific mathematical problem we will try to help you get in contact with people with the appropriate expertise. Of course: No warranty whatsoever!

Litterature

We ask you to purchase the textbook

Tom M. Apostol, *Mathematical Analysis*, Second Edition, Addison Wesley.

The book has been ordered by the university bookstore at Fredrik Bajersvej 7B2-221, phone: 9635 8072, e-mail: baj@centerboghandel.dk. The books have not arrived yet. We are not going through all of the book, and at some instances, we will have to supplement with handouts. You might find the book a bit terse at

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a quick glance, but we will try our best to show the applicability of the concepts by many examples.

All course schedules and plans for the sessions will be made available from the web-page

`http://www.math.aau.dk/~fajstrup/UNDERVISNING/PHD/05/index.html`.

Overall plan for a session

The course consists of three blocks of two and three day sessions in the period 9am – 3pm. The lectures will take place at the following locations (a map of campus can be found at `http://www.aau.dk/kort/campus.htm`).

Date	Location
Oct 24 & 25; Nov 7, 8, 29 & 30	Kroghstræde 7, room 63
Nov 28	Kroghstræde 3, room 1.115

Every session will consist of a mixture of lectures and exercise sessions.

What we expect from the participants

In order to make you benefit from the course as much as possible, we ask you to prepare for every session. We will clearly indicate, which parts of the textbook and/or of handouts we would like you to have looked at. Having your comments before or at the beginning of a session will make it easier for us to focus on the really interesting or really difficult parts.

Usually, the best spinoff from a course comes from your own activities. It is very hard to grasp theoretical concepts without "getting your hands dirty". This is why we will ask you to work on a range of exercises – some of them quite dull with the only purpose to train the use of concepts or results, others more advanced needing active reasoning.

Evaluation

There will be a hand-in problem set following each block. We expect you to work in small groups of 2-3 students and hand in one solution per group.

The first session

The plan for the first session will be up at the web-page
`http://www.math.aau.dk/~fajstrup/UNDERVISNING/PHD/05/index.html`
early next week. We start on Monday, Oct 24, 9am, at Kroghstræde 7, room 63.

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Looking forward to meeting you,

Lisbeth Fajstrup Morten Nielsen

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