

Course Description

Background:

The course consists of 4 days of coursework in applied mathematics, followed by a week long participation in the annual Study Group with Industry.

A Study Group is a workshop where academic mathematicians work on problems directly related to industry. Meetings of this nature have taken place in Great Britain for a number of years, going back to 1968 when Prof. Alan Tayler started the Oxford Study Group with Industry. The coordination of Study Groups is now in the hands of the European Consortium for Mathematics in Industry (ECMI), and the name is currently European Study Group with Industry (ESGI).

A Study Group runs five work days (Monday - Friday). On the first day of the meeting the participating companies present research problems they believe to be of a mathematical nature. Each such problem is taken up by a group of mathematicians who, together with the company representative, work towards the solution of the problem, through Thursday afternoon. Friday is used to present in a plenary session the results from each of the problem groups.

After the meeting, the groups finish the written report. At the latest two months after the meeting, the final report on the results of all the problem groups is made available to all participants.

Format:

The MMIM coursework runs Thursday-Sunday prior to the Study Group. Lectures alternate with exercises, and conclude with a mini-project.

Three 1-day lecture series on topics in applied mathematics will teach participants useful techniques based on concrete examples from modelling of industrial problems. The lectures are given by international experts, and are supported by exercises.

Participation in the Study Group with Industry will give students first-hand experience in mathematical modelling, working with international experts in the field trying to find solutions to real-world problems. A wide range of problem types are brought to Study Groups and a wide range of mathematical skills are assembled to solve them.

Coursework:

The lecture part of the Ph.D. course may involve some prior reading, and completion of a mini-project to be submitted after the lecture course before the Study Group begins.

During the Study Group, Ph.D. course participants are expected to be active in their problem solving groups, active in the solution presentation and also to contribute to the final report.

Venue:

The coursework and the Study Group takes place in 2008 at DTU.

Lecturers for the 2008 Ph.D. course:

Ekaterina Kostina (Marburg):

Efficient Methods for Parameter Estimation in Dynamic Processes and Introduction to Optimum Experimental Design

Mathias Stolpe (DTU):

Optimization

Christopher Bell (Oxford):

Modelling physical phenomena using PDE's

Language

All lectures will be given in English.

Evaluation and Diplomas

To pass the course, active participation is required. The Study Group organizers will assign the 5 ECTS credit on a pass/fail basis.

Registration:

Ask for a registration form from the DCAMM-course secretariat, attn.: Kari Haugland, Department of Mathematics, Technical University of Denmark, Building 303S, DK-2800 Lyngby, Denmark. Tel.: (+45) 45253031, Fax: (+45) 45881399, E-mail: dcamm@mat.dtu.dk.

Registration fee:

There is no registration fee for students enrolled at universities and public research institutions. For researchers employed at universities and public research institutions the registration fee is 500 EURO. This covers hand-outs, coffee and social events. For all other participants the registration fee is 1500 EURO.

Deadline:

Applicants should submit a request for registration to be at the hands of the course secretariat no later than **June 30th, 2008**. Information on enrollment will be posted within a week after this date.

Housing:

There are a limited amount of rooms available on the premises of the Technical University of Denmark (DTU). These will be offered free of charge to students and otherwise at a cost of EURO 25 Euro per night. Accommodation in hostels/hotels can also be arranged by the participants themselves, see e.g. the Wonderful Copenhagen website at www.woco.dk.

Scholarships:

For Ph.D.-students enrolled at non-Danish universities and research institutions outside the EU, we can offer a limited number of scholarships in order to facilitate participation, covering lodging (see above) and extra living costs with a per diem amount of 25 EURO. Travel expenses will not be covered. Your CV and a short letter of recommendation from your Ph.D.-supervisor should be sent in together with the application form.

Internet Resources

For facts on the Technical University of Denmark and visitor's information: see <http://www.dtu.dk>. For information about teaching and research at the DCAMM departments: see <http://www.dcammm.dk>.

Homepage for the European Study Group with Industry <http://www2.mat.dtu.dk/ESGI/66>

For general information about Study Groups with Industry in Denmark and abroad, see: <http://miis.maths.ox.ac.uk/>

For further information about the Ph.D. course, contact one of the ESGI61-organizers:

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DTU Mathematics

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About DCAMM

The **Danish Center for Applied Mathematics and Mechanics, DCAMM** is an informal framework for internationally oriented scientific collaboration between staff members at a number of departments at the Technical University of Denmark (DTU) and Aalborg University (AAU). The departments cooperating within DCAMM are:

- Dept. of Informatics & Mathematical Modelling, DTU
- Dept. of Mathematics, DTU
- Dept. of Mechanical Engineering, DTU
- Dept. of Civil Engineering, AAU
- Dept. of Mechanical Engineering, AAU

DCAMM is an informal construction. The day to day activities are coordinated by the secretary of the Center, while the formal governing body of DCAMM is the Scientific Council.

The **DCAMM International Graduate Research School** functions within the standard framework of the Ph.D.-education at the Technical University of Denmark (DTU) and at Aalborg University (AAU). Ph.D.-students associated to the School are full members of DCAMM through their departments and are enrolled in relevant Ph.D. programmes at DTU and AAU.

The School's role is to provide for an interdisciplinary framework for education of young researchers in an international research environment, and the activities are supported by Danish Agency for Research, Technology and Innovation (FUU).



Danish Center for Applied Mathematics and Mechanics

DTU Ph.D.-course 01819

Modern Methods in Industrial Mathematics



Department of Mathematics
Technical University of Denmark

14th-22nd August, 2008