

Course Description

The course will take place at the Lyngby Campus of the Technical University of Denmark. The course will cover the basics of probabilistic modeling in the context of wind engineering and structural engineering applications. Topics include:

- Basic statistics and probability theory for analysis of engineering data
- Calibration and use of probabilistic models in structural engineering problems
- Estimation of model uncertainties
- Statistical analysis and extrapolation
- Structural reliability analysis
- Calibration of safety factors
- Risk analysis
- Bayesian networks

The course work includes study of preparatory reading material before course start. The course consists of lectures, workshops with computer exercises, and work on a final project. The final project is defined in discussions during the course. The topic is individual for each participant and should reflect the participant's work and scientific interests.

On the last day of the course the participants are required to give a presentation of their work and interests and how the knowledge gained during the course can be used in their future projects.

Course homepage

<http://www.dcammm.dk>.

Organizer

Nikolay Dimitrov, Department of Wind Energy, Technical University of Denmark

Invited lecturers

Peter Friis-Hansen, DNV-GL

Mark C. Kelly, Department of Wind Energy, DTU

Participants

The course is designed for Ph.D.-students and final-year graduate students. Prior knowledge in probability theory and statistics is recommended. Experience with programming will be assumed.

Work Load

Approximately 90 hours in total, including work during the August 25 – 29 period at DTU (lectures, exercises, discussions, seminars), preparatory reading before course start, and writing a concise final report after the course.

Study Material

The course material consists of part of text books, articles and reports, and will be sent out electronically about two weeks before course start.

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>.

Language

All lectures will be given in English

Evaluation and Diplomas

To pass the course, active participation in all activities is required; this includes lectures, exercises, student presentations, and final report.

Grades: Pass/Fail. ECTS points: 3

Registration for Danish and international students:

Contact the course organizer, Nikolay Dimitrov, Department of Wind Energy, Technical University of Denmark,
E-mail: nkdi@dtu.dk
Tel.: (+45) 61396328

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 350 EURO. This covers hand-outs, coffee and social events. For all other participants the registration fee is 1050 EURO.

Deadline:

Applicants should submit a request for registration to be at the hands of the course organizer no later than August 17th, 2014. You will receive confirmation within a week from submitting the request, but no later than August 18th.

Accommodation:

There are a limited amount of rooms available on the premises of the Technical University of Denmark. These can be rented at approx. 25 Euro per night (contact N. Dimitrov).

Otherwise accommodation should be arranged by the participants themselves. See hostels/hotels in Lyngby and the official tourist site:

<http://lyngbyhostel.dk/?lang=en>

<http://www.fortunen.dk/>

<http://www.post-pub.s-10.dk/default.asp?pid=70>

<http://www.scandichotels.com/eremitage>

http://www.visitcopenhagen.com/tourist/plan_and_book/accommodation

Program outline (tentative):

Monday, August 25:

- Welcome
- Application of probabilistic methods in engineering (invited lecture)
- Introduction to probability theory and statistics
- Distribution fitting
- Uncertainty modelling

Tuesday, August 26:

- Fitting probabilistic models
- Multivariate modelling
- Reliability analysis
- Probabilistic modelling workshop

Wednesday, August 27:

- Random processes
- Statistical extrapolation
- Extreme wind modelling (invited lecture)
- Workshop on statistical extrapolation

Thursday, August 28:

- Design standards
- Risk analysis
- Bayesian networks
- Workshop in reliability analysis

Friday, August 29:

- Student presentations
- Project assignments discussion and workshop
- Course evaluation



DANISH CENTER FOR APPLIED MATHEMATICS AND MECHANICS

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), Aalborg University (AAU), Aarhus University (AU) and University of Southern Denmark (SDU). The Departments cooperating within DCAMM are:

- Dept. of Applied Mathematics and Computer Science, DTU
- Dept. of Civil Engineering, DTU
- Dept. of Mechanical Engineering, DTU
- Dept. of Wind Energy, DTU
- Dept. of Civil Engineering, AAU
- Dept. of Mechanical and Manufacturing Engineering, AAU
- Dept. of Engineering, AU
- Dept. of Mathematics and Computer Science, SDU
- Dept. of Technology and Innovation, SDU

DCAMM is an informal construction that was founded October 27, 1969. The day to day activities are coordinated by the chairman of the Center (pt. associate professor Christian Niordson, Department of Mechanical Engineering, Solid Mechanics), while the formal governing body of DCAMM is the Scientific Council.



DANISH CENTER FOR APPLIED MATHEMATICS AND MECHANICS

Ph.D.-course / Advanced school

Probabilistic methods in wind engineering

Technical University of Denmark
August 25-29, 2014

Organized by:

Department of Wind Energy
Technical University of Denmark

