The Department of Applied Mechanics at Aalto University School of Science and Technology is organising an intensive postgraduate course on Probabilistic Methods for Assessing Structural Integrity. The course is a part of the program of the National Graduate School in Engineering Mechanics.

The course will be lectured by professor Gregory Glinka from the University of Waterloo, Canada and Finland Distinguished professor at Aalto University. The lectures will be given at the Department of Applied Mechanics, address: Puumiehenkuja 5A, Espoo.

All the inquiries can be directed to Prof. Gary Marquis tel: +358 (0)9 470 23440, or email: gary.marquis@tkk.fi.

Course program

Lectures in lecture hall 118
Monday:
13.15—17.00,
Tuesday-Thursday:
9.15—12.00 and 13.15—16.00
Friday:
9.15-12:00

Topics:

1. Introduction to probability theory and probabilistic approaches in engineering and their advantages
2. Events and their mathematical description
3. Engineering applications of the Normal, Log-Normal, Weibul, Binomial, Poisson and other probability distributions
4. Classification of experimental data and their applications including estimation of parameters of probability distributions from experimental
5. Statistical evaluation of load, geometry and material properties
6. Probabilistic design for strength and durability
7. Numerical experiments and the Monte–Carlo method

Aalto University School of Science and Technology
Department of Applied Mechanics

Graduate school of Engineering Mechanics
Ph.D. course on

Probabilistic Methods for Assessing Structural Integrity

14-18 June 2010

A course given by

Gregory Glinka

Department of Mechanical Engineering
University of Waterloo, Canada
and Finland Distinguished professor at
Aalto University

André Bignonnet
ABC Consulting, France
former chief reliability engineer for
Peugeot-Citroen SA

Content

Engineering products (materials, components, machines, systems) are not identical even if the intention of the designer and manufacturer was to make them exactly the same. Scatter of products parameters is caused by the inability of existing technology to reproduce the same item absolutely identically. The existence of the scatter of product parameters means that for any particular product it is impossible to predict its properties with certainty and it is necessary to recognize that nearly all engineering variables are statistical quantities. These variables fall within a range of possible values and no single value should be singled out as representing the absolute certainty solution for a mechanical problem. Reliability can be defined as the probability that an object or product will be able to perform a specified function without failure for a predefined period of time under certain conditions. The Statistics and Theory of Reliability provides a mathematical framework and tools for quantifying of the level of reliability or uncertainty. Some understanding of the Theory of Probability and Statistics is necessary for the quantification of the reliability of engineering products/objects.

Course Material

Will be available at the start of the course

Participants

The participants are assumed to have a back-ground in applied mechanics, materials engineering, machine design or related discipline.

Requirements and credits (ECTS)

Attending lectures and successful completion of home exercises will give 5 credit points.

Further information

The lectures will be given in the Department of Applied Mechanics, Puumiehenkuja 5A, Espoo. (Number 12 in the map below).

Arriving to Otaniemi

Buses from the centre of Helsinki 102, 102T,103 (Line T via Lauttasaari)
194,195 via Munkkiniemi
From the centre of Tapiola
2,4,4T,10,15,52,194,195,505,510,512,550
Bus 103 stops at the library (24) on Otaniementie and both 194 and 195 stops opposite the library on Vuorimiehentie. Bus 102 stops on Otaniementie and Otakaari.
Aikataulut/Timetables http://www.ytv.fi/