Fluid Mechanics, Coastal and Maritime Engineering
Department of Mechanical Engineering

Winter Navigation
Visiting lecturer course, spring 2013

Aim and content of the course

The aim of the course is to give an overview of topics related to winter navigation and design of ships for ice conditions. The main topics covered are ship design, and navigation in first year ice existing in, e.g., the Baltic Sea. Some Arctic activities are also discussed.

The workload of the course corresponds to 5 ECTS, which includes 25 hours of lectures and, additionally, three exercises, totaling an approximate workload of 40 hours. Moreover, some time needs to be spent on the preparation for the exam. The course can be passed by carrying out satisfactorily at least two out of three exercises in addition to passing the exam. The final mark will be based on a weighting of the exam (2/3) and the exercises (1/3).

Lectures are on given Tuesdays during February and April 2013 as outlined in the programme below. The date of the exam is to be decided.

Course programme

Date	Time	Lecture content		Lecturer
12.02	09-10	Opening lecture, content, scheduling		Prof Pentti Kujala
	10-12	History of winter navigation in the Baltic Sea		Prof Pentti Kujala
	13-15	Definition of Arctic and Arctic activities		Prof Pentti Kujala
	15-16	Definition of the 1st exercise		Prof Pentti Kujala
02.04	10-12	Winter navigation system		Prof Pentti Kujala
	13-15	Effect of ice operations on ship design		Prof Pentti Kujala
	15-16:30 16:30-17:00	Seminar presentations of the 1st exercise Definition of the 2nd exercise		All students Prof Pentti Kujala
09.04	09-12	Ice occurrence, ice conditions, ice properties		Prof Pentti Kujala
	13-16	Ship resistance, maneuvering in ice, propulsion, power requirements		Prof Pentti Kujala
	16-17	Discussion on the 2nd exercise		Prof Pentti Kujala

16.04	09-12	Model scale testing in ice		Prof Pentti Kujala
	13-15	Ice induced loads on the hull, physics, statistical nature		Prof Pentti Kujala
	15-16:30 16:30-17:00	Seminar presentations of the 2nd exercise Definition of the 3rd exercise		All students Prof Pentti Kujala
23.04	09-12	Ice class rules, background, comparisons		Prof Pentti Kujala
	13-15	Examples of ice-going vessels		Prof Pentti Kujala
	15-17	Seminar presentations of the 3rd exercise		All students

About the lecturer

Pentti Kujala is a professor of marine technology (safety) at the Aalto University, School of Engineering in Finland. He has about 35 years of research experience related to ice-going vessels and structures. He has been working before e.g. at Lloyd´s Register of Shipping in London, VTT in Finland and Aker Yards in Finland. He got the degree of doctor of technology in Naval Architecture at Helsinki University of Technology on 1994. The main research interests have been devoted to the analysis of ice-induced loads and their statistical nature on ships and development of innovative structural solutions for various types of ships. Today the main topic is safety of ships both in open water and in ice. More information can be found here.

The course will take place at

Technical University of Denmark
Department of Mechanical Engineering
Section for Fluid Mechanics, Coastal and Maritime Engineeing
Nils Koppels Alle building 403
DK-2800 Kgs. Lyngby

The price of the course is DKK 1,500 which covers teaching, course materials and lunch.

Deadline for signing up is 4th February, 2013. Please sign up by contacting Head of Section, professor Jørgen Juncher Jensen on jjj@mek.dtu.dk or +45 4525 1384.