MJ2486 Aeromechanics Project Course - Part 2 7.5 credits

Projektkurs i aeromekanik - del 2

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Course syllabus for MJ2486 valid from Spring 2014

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Mechanical Engineering

Specific prerequisites

MJ2481 Aeromechanical project course 1, basic fluid dynamics, basic solid mechanics, basic engineering vibrations, basic CFD and FEM, basic turbo machinery

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The course intends to provide the students with necessary knowledge to be able to independently carry out state-of-the-art aeromechanical analyses by means of commercial software and to gain professional knowledge through a summer project course

In detail, after having completed the course, the students should be able to:

• use a state-of-the-art commercial analysis tool to carry out time-independent and transient numerical fluid dynamics calculations

• use a state-of-the-art commercial analysis tool to carry out numerical structure analysis

• be able to carry out parametric studies to examine specific aeromechanical aspects

• apply their knowledge gained through the THRUST program within the scope of an advanced project work

Course contents

1) Education of the students on professional analysis software with a focus on aeromechanics: all students get access to the commercial software package ANSYS. the software is provided for installation on student laptops. the first course phase deals with the following:

CFD (Computational Fluid Dynamics)

- meshing

- setup of stationary calculations

- solution and post-processing

- setup of instationary calculations

- solution and post-processing

FEM (Finite Element Modelling)

- meshing

- modal analysis

- forced resonance analysis

- stress analysis

The education is given as classroom seminars and through interactive self-study modules. As a test case, turbine cascade data are used from aeromechanical studies performed at the unit of Heat and Power technology (so-called AETR test data)

2) Seminars: a number of guest lecturers from the industry and other universities are invited to hold seminars about specific aspects within aeromechanics. The seminars typically consist

presentations of 1-2 hoursand a following open discussion. The seminars are held on campus and via web links in an interactive way. At two seminar sessions, the students present their project work: a) mid-way review for follow up and b) final presentation and discussion.

3) Summer internship: during the summer, the students will carry out 8-12 weeks of internship, at one of the companies associated with the THRUST program.

Project work:

The project work is carried out on an aeromechanical test case (steady aerodynamics, unsteady aerodynamics, unsteady aerodynamic damping, generalised forces)

Project Work:

Easter course:

The students participate during a few days in a poster session with their project work, either at a partner university or at a conference (e g ASME Turbo Expo)

Course literature

Inspelade föreläsningar och seminarier, föreläsningsanteckningar, inspelade tutorials, kommersiell programvara.

Examination

- SEM1 - Seminars, 1.5 credits, grading scale: P, F
- PROJ - Project, 6.0 credits, grading scale: A, B, C, D, E, FX, F
- SEM2 - Seminars, 0.0 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Project Work, 6 ECTS, grade A-F

Seminar 1 (Easter course), 1.5 ECTS, grade P/F

Seminar 2 (Summer internship), grade P/F

The entire course 7.5 ECTS, grade A-F according to project work grade

Ethical approach

- All members of a group are responsible for the group's work.

- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.