Faculty of Science

FYSD11, Physics: Fundamental Combustion, 7.5 credits

Fysik: Grundläggande förbränning, 7,5 högskolepoäng

First Cycle / Grundnivå

Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2009-10-07 to be valid from 2009-10-07, spring semester 2010.

General Information

The course is an elective course at the basic level for a scientific candidate or Master's degree (120 credits) in physics.

Language of instruction: Swedish and English
If needed, the course is given in English.

Main field of studies	*Depth of study relative to the degree requirements*
Physics	G2F, First cycle, has at least 60 credits in first-cycle course/s as entry requirements

Learning outcomes

The aim of the course is that students should have acquired the following knowledge and skills on completion of the course:

Knowledge and understanding

On completion of the course, the student should be able to

- explain how the concepts thermodynamics, chemical kinetics, radiation and transport processes are used to explain different properties for combustion processes.
- describe the physical processes that take place in basic and practical combustion systems.

Skills and abilities

On completion of the course, the student should be able to

- analyse a combustion process regarding efficiency and contaminants.
- calculate parameters as temperature and species concentration from thermodynamic data about a combustion process.
- with increased ability write laboratory reports with analysis of measurement data and discussion of sources of errors.
- summarise a project within the combustion area in writing and furthermore present it orally.

Judgement and approach

On completion of the course, the student should be able to

- understand the essential information in an advanced English textbook.
- solve assignments that require use of information from other sources than the course material for example via Internet and other available sources.

Course content

- Introduction
- Thermochemistry
- Chemical equilibrium
- Adiabatic flame temperature
- Chemical kinetics
- Ignition processes
- Combustion Physics
- Premixed and Diffusion flames
- Turbulent combustion
- Emissions
- Combustion diagnostics
- Practical combustion systems

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Laboratory session: Basic combustion.
Compulsory written assignment: Calculation of flame temperatures
Projects: A project equivalent 1.5 credits should be carried out in consultation with the lecturer. The project should be presented orally and in writing.

Course design

The teaching consists of lectures and exercises. Furthermore, there is a laboratory session and a written assignment, which both are compulsory.

Assessment

The course is completed with a compulsory project that is presented orally and in writing. To pass the course, certain credits must be achieved in written examination, laboratory sessions, written assignments and project. Students who do not pass the regular exam are offered a re-examination shortly after the regular exam.

Subcourses that are part of this course can be found in an appendix at the end of this document.

Grades

Marking scale: Fail, Pass, Pass with distinction.
To pass the entire course, approved examination, approved laboratory report, passed written assignment and passed project are required.
The grade is received through results of written examination. Well implemented written assignment and projects give additional credits on examination.

Entry requirements

For admission to the course, knowledge equivalent to FYSA31 is required, and English B.

Subcourses in FYSD11, Physics: Fundamental Combustion

Applies from V10

0901 Fundamental Combustion, 7,5 hp
Grading scale: Fail, Pass, Pass with distinction