



Course syllabus

Faculty of Technology

Kalmar Maritime Academy

1FT26I Förbränningsmotorer, 7,5 högskolepoäng

1FT26I Internal Combustion Engines, 7.5 credits

STCW reference

Sektion A-III/1 och A-III/2

Subject Group

Other Subjects within Technology

Level of classification

First Level

Progression

G1N

Date of Ratification

Approved by Faculty of Technology 2018-05-14

The course syllabus is valid from spring semester 2019

Prerequisites

General entry requirements and Mathematics 2a / 2b / 2c, Physics 1b1 / 1a or Mathematics B, Physics A (Field-specific entry requirements 7/A7). Physics A, Physics 1b1/1a can be replaced by Nature science 2 or Machine Commander class VII 40 hp

Objectives

Proficiency and comprehension

By the end of this course, students will be able to:

- name and identify combustion engine components
- explain and describe the operation and control of combustion engines including computer controlled engines
- describe dynamic and rotating forces in piston engines

Skills and abilities

By the end of this course, students will be able to:

- calculate efficiency, compression rates, fuel consumption, power and pressure in internal combustion engines
- perform and analyze practical cylinder pressure measurement
- perform practical measurement in the gas turbine process

- write a report concerning new technologies in marine combustion engine technology

Evaluation skills and Approach

By the end of this course, students will be able to:

- evaluate the performance of combustion engines in terms of efficiency and environment

Content

- classification and certification of piston engines incl. NOx certification
- piston engine and gas turbine processes
- design and operation of piston engines and gas turbines
- piston engine and gas turbine monitoring and safety systems
- pV-, pressure/angle-, weak spring-, and delta pressure diagram
- piston engine charging system
- power relationship, losses, efficiency and fuel consumption
- controlled internal combustion engine systems including common rail
- top pressure indication
- critical speed, power and balancing
- the dynamics of the cam and crankshaft
- current combustion engine research with special focus on marine applications

Type of Instruction

Teaching consists of lectures and practical exercises.

Examination

The course is assessed with the grades Fail (U), Pass (G) or Pass with Distinction (VG).

Assessment of the students' performance is made through written examination, written report and practical exercises. In order to receive the grade Pass with distinction, the student must receive Pass with distinction on the written exam.

Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed.

Required Reading and Additional Study Material

Kuiken, Kees, *Diesel Engines I+II*, Target Global Energy Training. Senaste upplagan. 150 pages.

Alvarez, Henrik, *Energiteknik del 1 och 2*. Lund: Studentlitteratur. Senaste upplagan. 150 pages.

Teknisk formelsamling, Sjöfartshögskolan

Föreläsningsunderlag, Sjöfartshögskolan