



# SD2306 Railway Systems and Rail Vehicles 9.0 credits

Spårtrafiksystem och spårfordon

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

## Establishment

Course syllabus for SD2306 valid from Autumn 2007

## Grading scale

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

## Education cycle

Second cycle

## Main field of study

## Specific prerequisites

Fundamentals of mechanical and electrical engineering.

## Language of instruction

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

## Intended learning outcomes

The course aim is to give you the fundamentals of the different parts of the railway system and their properties. The course also describes in more detail the components and functions of rail vehicles as well as the various demands a rail vehicle must fulfil. The course should give you a good platform for work in the field of railway engineering.

After a completed course you should be able to:

- clarify the different parts in railway systems and their possibilities and limitations
- explain how the tracks, signal safety systems and electrification work and can be improved
- design a time table for train traffic on a given railway line
- explain how bogies, carbody tilting, traction and brake systems work and can be improved
- calculate train performance like acceleration and braking capacity, average speed and energy consumption
- determine realistic measures and interior design for a train at a given operational task
- estimate the incomes and costs for a given train traffic concept
- discuss the trends and future potential for railway traffic

## Course contents

Introduction to railway technology, organisation etc. Track constructions and track technology. Rail vehicles - overview. Rail vehicle dynamics and vehicle-track interaction. Electric train operation and pertinent stationary parts. Signal and traffic operation systems. Train traffic – market, demands, terminals, planning and capacity. The railway and the environment: energy consumption, air pollutions, external noise, external vibrations, space and barrier aspects. Economy. Railway traffic development and future. Rail vehicles - technical basis. Aerodynamics and running resistance. Running gear, bogies and car body tilting. Traction technology: traction motors, transmission, traction mechanics and current collection. Braking technology. Car bodies. Passenger environment, interior design and auxiliary power. Internal noise, internal vibrations and climate resistance. Rail vehicle market and development. Exercises. Project task: to design a high speed train. Study visit.

## Course literature

Andersson E and Berg M: Railway Systems and Rail Vehicles, text book in two parts (in Swedish), Div. of Rail Vehicles, KTH, Stockholm.

## Examination

- PRO1 - Project, 3.0 credits, grading scale: P, F
- TEN2 - Examination, 3.0 credits, grading scale: P, F
- TEN1 - Examination, 3.0 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.

## **Other requirements for final grade**

Written exams (TEN1, TEN2; each 3 university credits), project task (PRO1, 3 university credits).

## **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.