

**SYLLABUS**

# **Vehicle systems 2 7.5 credits E0009E**

**Bilens system 2**

**Course syllabus admitted: Autumn 2023 Sp 1 - Present**

**DECISION DATE  
2023-02-16**

# Vehicle systems 2 7.5 credits E0009E

## Bilens system 2

### First cycle, E0009E

Education level	Grade scale	Subject	Subject group (SCB)
First cycle	G U 3 4 5	Elektroteknik	Electrical Engineering

## Entry requirements

In order to meet the general entry requirements for first cycle studies you must have successfully completed upper secondary education and documented skills in English language and basic mathematics; calculus (M0049M Linear Algebra and Differential Equations).

Knowledge in English, equivalent to English 6.

## Selection

The selection is based on 1-165 credits.

## Course Aim

After completing the course, the student shall be able to:

1. design and implement hardware interfaces to connect sensors and actuators to a micro-controller,
2. design software and code them in assembly and C before flashing them onto a micro controller (this includes peripheral configurations and different serial communication protocols),
3. perform a Failure Mode and Effect Analysis.

### Knowledge and understanding

The students shall develop skills such as

- Software engineering and system design,
- Programming micro-controllers,
- Failure Mode and Effect Analysis.

### Judgement and approach & Competence and skills

This course addresses the electrical and electronic parts of automotive systems. The students shall therefore develop the ability to design conditioning circuits to connect sensors and actuators to a micro-controller as well as to program the micro-controllers. The latter encompasses peripherals configuration and different serial communication protocols used in automotive applications.

## Contents

The students are given micro controller development boards with different sensors and actuators. The students shall learn to connect these sensors and actuators to the micro controllers and configure the chip's peripherals to achieve a complete embedded system.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

This course includes learning activities such as system modeling, software modeling, programming in C, SPICE simulation, and Failure Mode and Effect Analysis.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. The course is assessed through:

- The development of an application (of the student's choice) model implemented on the course's development board and its associated software models (Grades U or G),
- Presentation of the above application model with the ability to modify the code and its associated Failure Mode and Effect Analysis (Grades U, 3, 4 & 5 as a function of the number of peripherals used).

## Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

## Overlap

The course E0009E is equal to SME135

## Course offered by

Department of Computer Science, Electrical and Space Engineering

## Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0003	Oral examination	G U 3 4 5	4.5	Mandatory	A13	
0004	Project work	U G#	3	Mandatory	A13	

## Last revised

by Robert Brännström, HUL at the Department of Computer Science, Electrical and Space Engineering 2023-02-16

## Syllabus established

by the Department of Computer Science and Electrical Engineering 2007-02-28