

# Einführung in eingebettete Systeme

## Content

Basic introduction to technologies, functions and design of embedded systems: Typical requirements, examples of product and production automation, introduction to microcontrollers, introduction to Logic Control with PLCs, device technology, and according tools.

The control part of the former lecture „Introduction to Embedded Systems“ can be found in the new lecture Dynamic Systems for Computer Scientists now.

## Lecture

Lecture	Slides
1	<a href="#">Organisational issues, Introduction, Microcontrollers</a>
2	<a href="#">Microcontrollers 2</a>
3	<a href="#">Microcontrollers 3</a>
4	<a href="#">Microcontrollers 4</a>
5	<a href="#">Introduction to Logic Control</a>
6	<a href="#">PLCs 1, Slides</a>
7	<a href="#">PLCs 2</a>
8	<a href="#">PLCs 3</a>
9	<a href="#">PLCs 4</a>

## Literature

- Barr: Programming Embedded Systems in C and C++
- Pont: Embedded C
- Lunze: Automatisierungstechnik, Oldenbourg, 2003.
- Lewis: Programming industrial control systems using IEC 1131-3, IEE, 1998.
- Webpage TU Wien: [Script](#) (1.2M) and according [webpage](#)

## Exercise course

- (in English or German)
- Conditions for getting a certificate (Übungsschein): participation in the exercises on a regular basis followed by an exam at the end of the semester.
- During the first half of the exercises, students will work with the ATMEL [ATmega16](#) AVR microcontroller (8bit RISC).
- In the second half, students will learn about PLCs (Programmable Logic Controllers).

## Microcontroller part

The software we are using is Freeware! Since the Atmel Studio also offers a simulator (running in simulator mode as soon as no device is connected) you can experiment with it at home. You need WINAVR and the AVR studio 4. A local copy of the WIN AVR Studio used in the lab course can be found here. Slides with a detailed step by step description of the design flow using WINAVR along with the AVR Studio can be found here (501kB). A short overview can be found here (10kB). More information can be found on atmel.com and in the according sections of Falk Salewski's Link List.

- [Download](#) Microcontroller exercise sheet
- [Download](#) Slides Microcontroller Basics
- [Download](#) Slides Introduction Timer
- [Download](#) Slides Introduction Interrupts
- [Download](#) Slides Introduction Analog to Digital conversion
- [Download](#) Slides Using LCD with ATmega16

## Programmable Logic Controller (PLC) part

- [CoDeSys](#): Softwaretool for programming & simulating PLC software
  - [Download CoDeSys free demo](#) you can use for the exercise
- [Download](#) PLC exercise sheet 1
- [Download](#) PLC exercise sheet 2
- [Download CoDeSys Task 1 \(Gas Burner\) FBD,RLL,background,.zip](#)
- [Download](#) CoDeSys Task 2 (Batch Dilution Process)
- [Download](#) CoDeSys Task 3 (Twin Pump System)

## Dates

- Lecture: Tue, 10:00-11:30, AH IV
  - The first lecture started on Oct 25th 2005.
- Exercises: Wed, 12:45-14:30, 2323
  - We have two regular exercise groups. The exercise for each group will take place fortnightly.
  - Group A (English) started Oct 26th
  - Group B (German) will start Nov 2nd
  - We plan four exercises on microcontrollers and three on PLCs.
  - PLC exercises for group C will be on January 18th and 25th 2006 from 15:15 to 17:30.
- The exam for master students and the Übungsschein will take place in the last lecture (February 7th, 2006).

## Forum

- [Forum Introduction to Embedded Systems](#)

## Contact

- Falk Salewski
- [Campus](#)

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