



**Technische Universität
München**

**Fakultät für Informatik
Forschungs- und Lehrereinheit Informatik VI
Robotics and Embedded Systems**

**Lab Course
“Microcontroller Programming”**

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Introduction

Content Overview (tentative)

1. **Introduction:** Organizational issues, microcontroller basics, AVRStudio IDE
2. **Simple I/O:** Digital input and output, LEDs and switches
3. **Serial Communication:** Simple serial communication
4. **Interrupts:** Interrupt service routines, enhanced serial communication
5. **Timers:** Timers and timer resolution, prescalers, pulse-width modulation (PWM)
6. **Motor Speed Control:** Driving a DC motor, simple control tasks
7. **DCF77 Time Signal:** DCF77 purpose and history, signal encoding
8. **Digital Sensors:** Proprietary communication protocols, temperature sensors
9. **Liquid Crystal Display Modules:** SPI communication protocol, LCDs
10. **Analog Signal Acquisition:** Analog/digital converters (ADCs)
11. **Communication:** Communicate with other microcontrollers
12. **Distributed Applications:** Form a network of microcontrollers to achieve a common goal
13. **Microcontroller Periphery:** Simple microcontroller circuits (2 sessions)

Organizational Issues

Organizer

Name	E-mail	Room	Telephone
Michael Geisinger	geisinge@in.tum.de geisinger@fortiss.org	03.07.042 F239	internal: (089 289) 18111 external: (089) 3603522 513

General Conditions

- Only participants that regularly attend the lab course will receive a certificate.
- Your solutions must include appropriate documentation!
- Expect to be asked some questions about your implementation.
- Save each of the solutions to the exercises in this lab course as a separate *AVRStudio* project and commit all projects together with the answers to the questions to Subversion. Find details about this process at the first exercise sheet.
- If you want to work beyond the regular lab course hours, fetch the hardware from room 03.07.042, sign your name on the list of borrowed hardware and bring the hardware back when you leave. Do **not** take the hardware home with you.

Materials

You can find the most recent versions of the materials for the lab course in Subversion. The network share Z:\ is your personal home directory where you should store files related to the exercises (e.g., your Subversion working copy).

Your Notes

Group number: _____

