| Hardware Software Codesign | | | | | AR-227 |
|---|---|---|---|---|---|
| **Rota**<br>annually SS | **Duration**<br>1 Semester | **Semester**<br>2nd (Semester) | **SWS**<br>3 SWS | **Credit Points**<br>10 | **Workload**<br>300 h |

**1 Modul Structure**

| Course (Abbreviation) | Type/ SWS | Presence | Self Study | Credit Points |
|---|---|---|---|---|
| a) Hardware Software Codesign | Lecture/ 3 SWS | 35 h | 135 h | 6 |
| b) Hardware Software Codesign | Tutorial/ 1 SWS | 15 h | 50 h | 2 |
| **c)** Hardware Software Codesign | Practical Course | 25 h | 40 | 2 |

**2 Language**

English

**3 Content**

1. Design of mixed Hadrware/Software solutions for embedded systems,
2. Understanding of design components
3. Understanding of system-level design paradigms,
4. HW/SW partitioning
5. Optimization methods
6. Performance analysis measures
7. Evaluation methods
8. Modeling and Performance analysis of safety-critical and real-time embedded systems.

**Literature**

[1] „Specification and Design of Embedded Systems", D. Gajski, Prentice Hall 1994,
ISBN 0-13-150731-1

[2] „Digitale Hardware/Software Systeme – Synthese und Optimierung", J. Teich,
Springer Verlag 1997, ISBN 3-540-62433-3

**4 Competencies**

By attending this course, students will learn the design of complex electronic systems at high level of abstractions. This includes the optimized partitioning, scheduling and evaluation of mixed hardware and software design solutions dedicated to embedded systems. During the Tutorials the students acquire knowledge about advanced related topics in HW/SW codesign and performance analysis for safety-critical and real-time embedded systems.

During the practical exercises to the lecture the students will apply the theoretical knowledge of the lecture considering real-world scenarios to allow a better accessibility to the methods explained. Starting from simple system specification the students will use tools for partitioning, optimization and performance analysis to synthesize the hardware/software system.

**5 Examination Requirements**

- Oral exam (max. 40 minutes) or written exam (max. 180 minutes)
  All students are required to successfully complete 2 out of 4 special assignments in order to be admitted to the final exam.
- All students are required to successfully complete the lab tasks.

**6 Formality of Examination**

☒ Module Finals ☐ Accumulated Grade

**7 Module Requirements (Prerequisites)**

Basic knowledge of computer architectures, basic knowledge of C programming language.

**8 Allocation to Curriculum:**

Program: Automation & Robotics, Field of study: Cognitive Systems

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| **9** | **Responsibility/ Lecturer**<br>*Prof. Dr.-Ing. Selma Saidi/* Prof. Dr.-Ing. Selma Saidi |