Real-time Operating Systems Development	Modulnummer:
Real-time Operating Systems Development	

Bachelor
  Pflicht/Wahl ⊠
  Wahlpflicht ☐
  Wahl ☐
  Sonderfall ☐
		Modulbereich: Pflicht	

Anzahl der SWS	V	UE	K	S	Prak.	Proj.	Σ		Kreditpunkte: 6	Turnus every year
	2	2	0	0	0	0	4			

Formale Voraussetzungen: Keine

Inhaltliche Voraussetzungen: -

Vorgesehenes Semester: ab 1. Semester

Sprache: Englisch

Ziele: Students

1) know how to program a real-time application from scratch on "bare-metal", that is, WITHOUT a supporting operating systems

2) know how to design an elegant real-time operating system kernel from scratch

3) understand the right balance between architectural beauty and optimised performance

4) know about basic benchmarks assessing the real-time capabilities of an RTOS

5) know how to do practical real-time application programming and RTOS development from scratch on a simple ARM-based computer architecture (BeagleBone Black)

Inhalte: .

1) Bare-metal programming on BeagleBode Black boards using the Code Composer Studio development environment (Eclipse-based)

2) The State Machine programming paradigm with cooperative multi-tasking, scheduling, watchdog monitor

3) Periodic time-controlled activities

4) Simple context switching: Programming user threads and associated schedulers

5) Inspiration from micro kernels: RTOS architecture with communication channels and ports

6) Filtered and prioritised real-time port handling

7) Real-time synchronisation mechanisms

8) Time-triggered versus event-based RTOS paradigms

9) RTOS Benchmarks

Unterlagen (Skripte, Literatur, Programme usw.):
- Wang, K.C. Embedded and Real-Time Operating Systems. DOI 10.1007/978-3-319-51517-5_2. Springer 2017.
- Kopetz, H. Real-Time Systems: Design Principles for Distributed Embedded Applications. Second edition. Springer 2011.
- Walls, C. Building a Real-Time Operating system. Rtos from the ground up. Elsevier Science & Technology 2007.
- Cooling, J. Real-time Operating Systems Book 1. The Theory. Lindentree Associates, 2017.
- Cooling, J. Real-time Operating Systems Book 2. The Practice. Lindentree Associates, 2017.

Form der Prüfung:
Oral module examination or

Exercises and oral technical discussion (Fachgespräch)

Arbeitsaufwand	Präsenz	0 h
	Übungsbetrieb/Prüfungsvorbereitung	180 h
	Summe	180 h

Lehrende:	Verantwortlich:
Jan Peleska	Jan Peleska