

Real-time Operating Systems Development <i>Real-time Operating Systems Development</i>								Modulnummer:	
Bachelor Pflicht <input type="checkbox"/> Winf-Schwerpunkt-Pflicht <input type="checkbox"/> Winf-Schwerpunkt-Wahlpflicht <input type="checkbox"/> Winf-Wahl <input type="checkbox"/>				Schwerpunkt Computational Finance <input type="checkbox"/> E-Business <input type="checkbox"/> IT-Management <input type="checkbox"/> Logistik <input type="checkbox"/>					
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: Good programming skills in C are mandatory. A thorough understanding of basic operating systems concepts is very helpful for this lecture.									
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.): <ul style="list-style-type: none"> • 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: Jan Peleska	Verantwortlich: Jan Peleska	