| Óbuda University<br>Kondá Kálmán Fogultu of Electrical Engineering   |   |  |  | Department of Instrumentation ans Automation   |   |  |  |  |
|--|---|--|--|--|---|--|--|--|
| Subject name and code: Real-time operating systems, KMVRO1ABNE Credits: 4  |   |  |  |  |   |  |  |  |
|  |   |  |  |  |   |  |  |  |
| Specializations: All free.chice subject  |   |  |  |  |   |  |  |  |
| Subject leader: Dr. Schuster György  |   |  | Teachers   | Dr. Schuste  | Dr. Schuster György   |  |  |  |
| Prerequisites: none  |   |  |  |  |   |  |  |  |
|  |   |  |  |  |   |  |  |  |
| Theory   | v <b>: 2</b>  | Seminar.: 0  | ]  | Lab. Exec.: 0  | Cor   | nsultatio  | ons: 0   |  |
| Semest   | nester mark   |  |  |  |   |  |  |  |
| Education material   |   |  |  |  |   |  |  |  |
| <i>Aim of education</i> : Students will learn about the features of real-time operating systems and their application in a variety of environments. Learn how to implement an operating system on microcontrollers |   |  |  |  |   |  |  |  |
|  |   |  |  |  |   | Week:  |  |  |
| •  |   |  |  |  |   |  |  |  |
| of RT operating systems. Scheduling.   |   |  |  |  |   |  |  |  |
| Comparison of "traditional" and RT operating systems. Examples.  |   |  |  |  |   | 2.   |  |  |
| IPC solutions for operating systems. Multi tasking requirements.   |   |  |  |  |   | 3.   |  |  |
| Resource protection MUTEX and semaphore. Dead lock cases and their release.  |   |  |  |  |   | 4.   |  |  |
| Choice between native programming and operating system.  |   |  |  |  |   | 5.   |  |  |
| FreeRTOS basic concepts, availability, scope of use.   |   |  |  |  |   | 6.   |  |  |
| Implementing FreeRTOS on an 32-bit microcontroller.  |   |  |  |  |   |  |  |  |
| Task definition and boot on FreeRTOS on an 32-bit device.  |   |  |  |  |   |  |  |  |
| OSEK RTOS features.  |   |  |  |  |   |  |  |  |
| OSEK implementation.   |   |  |  |  |   |  |  |  |
| OSEK hooks.  |   |  |  |  |   |  |  |  |
| QNX features   |   |  |  |  |   | 12.  |  |  |
| Native solution and RTOS solution.   |   |  |  |  |   | 13.  |  |  |
| Test work  |   |  |  |  |   | 14.  |  |  |
| Demand of the semester   |   |  |  |  |   |  |  |  |
| The semester ends with a mid-year ticket. At the end of the semester, students write an 20-  |   |  |  |  |   |  |  |  |
| question electronic test. The test questions contain 3 answers, one of which is correct. A   |   |  |  |  |   |  |  |  |
| condition for a sufficient grade is the correct answer to 4 questions. The scores increase in  |   |  |  |  |   |  |  |  |
| direct proportion to the increase in the score.  |   |  |  |  |   |  |  |  |
| Literature:<br>Obligatory: Materials issued by the instructor  |   |  |  |  |   |  |  |  |
|  | All free.ch<br>Dr. Schu<br>Dr. Schu<br>Dr. Schu<br>Semest<br>Students w<br>hents. Learn<br>concepts<br>systems.<br>ditional" an<br>perating syn<br>h MUTEX<br>tive prograa<br>perating syn<br>h MUTEX<br>tive prograa<br>na boot on Fr<br>res.<br>tion. | All free.chice sub<br>Dr. Schuster Gy<br>Dr. Schuster Gy<br>Dr. Schuster Gy<br>Dr. Schuster Gy<br>Dr. Schuster Gy<br>Dr. Schuster Gy<br>Dr. Schuster Gy<br>Semester mark<br>Students will learn<br>nents. Learn how to<br>concepts. Hard<br>systems. Sched<br>ditional" and RT op<br>perating systems. M<br>n MUTEX and sem<br>tive programming a<br>oncepts, availability<br>RTOS on an 32-bit<br>boot on FreeRTOS<br>res.<br>tion. | All free.chice subject<br>Dr. Schuster György<br>me<br>Theory: 2 Seminar.: 0<br>Semester mark<br>Educat<br>Students will learn about the featur<br>nents. Learn how to implement an o<br>Topics:<br>concepts. Hard and soft real<br>systems. Scheduling.<br>ditional" and RT operating systems<br>perating systems. Multi tasking requ<br>n MUTEX and semaphore. Dead loo<br>tive programming and operating systems.<br>Poncepts, availability, scope of use.<br>RTOS on an 32-bit microcontroller.<br>boot on FreeRTOS on an 32-bit de<br>res.<br>tion.<br>I RTOS solution.<br>Demand of<br>adds with a mid-year ticket. At<br>nic test. The test questions con-<br>sufficient grade is the correct an<br>n to the increase in the score.<br>Lite | ulty of Electrical Engineering   and code: Real-time operating systems, KMV   All free.chice subject   Dr. Schuster György   Teachers   :   one   Theory: 2 Seminar.: 0   Image: Semester mark   Education materi   Semester mark   Education materi   Students will learn about the features of real-tents. Learn how to implement an operating systems.   Concepts. Hard and soft real-time features   systems. Scheduling.   ditional" and RT operating systems. Examples   perating systems. Multi tasking requirements.   n MUTEX and semaphore. Dead lock cases an   tive programming and operating system.   oncepts, availability, scope of use.   RTOS on an 32-bit microcontroller.   boot on FreeRTOS on an 32-bit device.   res.   tion.   IRTOS solution.   Demand of the sema   dds with a mid-year ticket. At the end o   nic test. The test questions contain 3 ar   turfticient grade is the correct answer to   nic test. The test questions contain 3 ar   turfticient grade is the correct answer to   ni to the increase in | ulty of Electrical Engineering   and code: Real-time operating systems, KMVRO1ABNE Cr   All free.chice subject   Dr. Schuster György   Teachers Dr. Schuster   ome   Theory: 2 Seminar.: 0   Lab. Exec.: 0   Semester mark   Education material   Students will learn about the features of real-time operating systems. Learn how to implement an operating system on microc   Topics:   concepts. Hard and soft real-time features. Gener systems. Scheduling.   ditional" and RT operating systems. Examples.   perating systems. Multi tasking requirements.   n MUTEX and semaphore. Dead lock cases and their release.   tive programming and operating system.   oncepts, availability, scope of use.   RTOS on an 32-bit microcontroller.   boot on FreeRTOS on an 32-bit device.   res.   tion.   IRTOS solution.   IRTOS solution.   Demand of the semester   dds with a mid-year ticket. At the end of the semester   not the increase in the score.   Literature: | ulty of Electrical Engineering   and code: Real-time operating systems, KMVRO1ABNE Credits: 4   All free.chice subject Dr. Schuster György   Dr. Schuster György Teachers Dr. Schuster György   ine Image: State of the state of t | ulty of Electrical Engineering   and code: Real-time operating systems, KMVRO1ABNE Credits: 4   All free.chice subject Dr. Schuster György   Dr. Schuster György Teachers Dr. Schuster György   ine Itab. Exec.: 0 Consultation   Semester mark Education material Consultation   Students will learn about the features of real-time operating systems and their application W   concepts. Hard and soft real-time features. General structure systems. Scheduling. W   concepts. Hard and soft real-time features. General structure systems. Multi tasking requirements. 3.   n MUTEX and semaphore. Dead lock cases and their release. 4.   tive programming and operating system. 5.   nncepts, availability, scope of use. 6.   RTOS on an 32-bit device. 8.   res. 9.   tion. 10.   11. 12.   IRTOS solution. 13.   14. Demand of the semester   Juster Students write an nic test. The test questions contain 3 answers, one of which is correct. A sufficient grade is the correct answer to 4 questions. The scores increase in the score. |  |

Obligatory: Materials issued by the instructor Recommended: http://embeddedcookbook.com/parts/FREERTOS/docs/