

Embedded Operating System Introduction

Graziano Pravadelli



Objectives

- To understand the main differences between conventional operating systems and embedded operating systems
- To train students on advanced theoretical and implementation aspects of embedded operating systems, in a distributed and real-time scenario



Contents

- Embedded operating systems
 - Architectures
 - Main features
- Real time operating systems
 - Design principles
 - Task scheduling
 - Resource access protocols
- Synchronization mechanisms
- Case studies

Learning outcomes (knowledge)

- Students must demonstrate they have acquired the fundamental knowledge to understand the internal organization, operation and services of the embedded operating systems
- In particular, they will have knowledge on:
 - differences between a conventional operating system and an embedded operating system in a distributed and real-time scenario
 - strategies used by the embedded operating systems to manage resources
 - application fields of embedded operating systems

Learning outcomes (skills)

- Independently assess the advantages and disadvantages of different design choices in the context of the services offered by an embedded operating system, also in a distributed and real-time environment
- Carry out a group laboratory project and present the results by motivating the choices with language appropriateness
- Independently continue the study and research in the field of distributed, embedded and real time operating systems, addressing advanced issues both in the industrial and scientific fields

Exams



PRESENTATION TO THE
CLASSROOM OF AN EMBEDDED
OS



WRITTEN EXAM



LABORATORY PROJECT
(OPTIONAL)
+4 POINTS

MAX SCORE: 30

Schedule

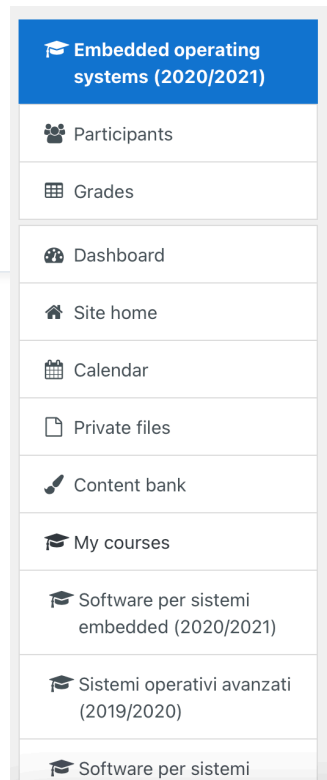
Date	Day	Time	Hours	Topic
4/3	gio			
5/3	ven			
11/3	gio	15:20-17:00	2	Introduction to EOS
12/3	ven			
18/3	gio			
19/3	ven	8:40-11:10	3	Real time OS - basic concepts
25/3	gio	15:20-17:00	2	Real time OS - aperiodic task scheduling
26/3	ven	8:40-11:10	3	Real time OS - periodic task scheduling
1/4	gio	15:20-17:00	2	Real time OS - periodic task scheduling
2/4	ven			Easter vacation
8/4	gio			
9/4	ven	8:40-11:10	3	Real time OS - priority servers
15/4	gio	15:20-17:00	2	Real time OS - priority servers
16/4	ven	8:40-11:10	3	Real time OS - resource access protocols
22/4	gio	15:20-17:00	2	Real time OS - design issues
23/4	ven	8:40-11:10	3	Distributed synchronization
29/4	gio	15:20-17:00	2	Distributed synchronization
30/4	ven	8:40-11:10	3	Distributed synchronization
6/5	gio	15:20-17:00	2	Yocto
7/5	ven	8:40-11:10	3	FreeRTOS
13/5	gio			
14/5	ven	8:40-11:10	3	FreeRTOS
20/5	gio			
21/5	ven			Patron Saint
27/5	gio			
28/5	ven	8:40-11:10	3	Android
3/6	gio			
4/6	ven	8:40-11:10	3	Android
10/6	gio	15:20-17:00	2	Student presentations
11/6	ven	8:40-11:10	3	Student presentations

Teaching aids

- E-learning web site
 - Slides
 - Scientific papers
 - Interesting links

- Book

- G. Buttazzo. “Hard Real-Time Computing Systems”
3rd edition. Springer, 2011.




Embedded operating systems (2020/2021)

[Dashboard](#) / [My courses](#) / [Embedded operating systems \(2020/2021\)](#)

 [Annunci](#)

Zoom link

 [Click here for accessing lessons](#)

Calendar

 [Lesson's time table](#)

Teaching materials

 [Slides](#)

 [Additional material](#)

