

SETR - 2022 / 2023

Lecture	Dates	Planning	notes
1	7-fev	Course introduction. Objectives, organization, assessment. Context and course perspective on Embedded Systems.	Lectures, only
2	14-fev	Embedded systems. Examples. Main requirements. Hardware and software platforms for embedded systems. Typical interfaces. Cross platform development. Compiling, linking and debugging. Memory models.	
3	28-fev	Real-Time requirements. Models of computation. Task model and execution time abstraction. Models for tracking the environment. Introduction to task scheduling. Offline scheduling techniques.	
4	7-mar	Online task scheduling with fixed priorities. Rate-Monotonic Scheduling (RMS), Deadline-Monotonic Scheduling (DMS), Generalized Fixed Priorities Scheduling (FPS). Utilization-based schedulability tests. Response-time schedulability tests. Online task scheduling with dynamic priorities. Earliest Deadline First scheduling (EDF). Differences to RMS. Utilization-based schedulability tests. Response-time and processor-demand tests.	
5	14-mar	Sharing resources across tasks. Critical sections. Basic synchronization techniques: interrupt and preemption disabling. Priority inversion and blocking time. Synchronization techniques based on semaphores. Priority inheritance. Priority ceiling. Stack resource policy. Handling aperiodic tasks. Concept of server. Examples of servers for FPS and EDF.	
6	21-mar	POSIX profiles for embedded real-time systems. Common interfaces of Real-Time Operating Systems.	
7	28-mar	Exam + project assignments	Exam
	04-abr	Easter holidays	
8	11-abr	The Arduino platform. Simple multi-tasking programming patterns, the cyclic executive pattern. Interrupt service routines as tasks. The cycle executive with periodic trigger using a timer interrupt.	Guided practice
9	18-abr	Seminar with students presentations + project development	Project, only
10	2-mai	Project development	Projects
	09-mai	Academic week	
11	16-mai	Project development	
12	23-mai	Project development	