Syllabus

Course Description

Course Title	Operating and real-time systems
Course Code	42429
Course Title Additional	
Scientific-Disciplinary Sector	IINF-05/A
Language	Italian
Degree Course	Bachelor in Electronics and Cyber-Physical Systems Engineering
Other Degree Courses (Loaned)	
Lecturers	Prof. Dr. Andrea Alexander Janes, Andrea.Janes@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/2237
Teaching Assistant	
Semester	Second semester
Course Year/s	2
CP	6
Teaching Hours	40
Lab Hours	20
Individual Study Hours	90
Planned Office Hours	18
Contents Summary	• Operating systems principles. • Real time systems principles. • Multi-programming, multi-tasking. • Scheduling and management of processes. • Communication and synchronization. • Memory management.
Course Topics	• Operating systems principles. • Real time systems principles. • Multi-programming, multi-tasking. • Scheduling and management of processes.

	• Communication and synchronization. • Memory management.
Keywords	Processes, scheduling, synchronization, memory, real-time
Recommended Prerequisites	C programming at intermediate level, as taught in the Fundamentals of Programming II course; Data structures and algorithms key concepts, as taught in the Algorithms and Programming course
Propaedeutic Courses	
Teaching Format	Frontal lectures, exercises, labs
Mandatory Attendance	Attendance is not compulsory, but non-attending students have to contact the lecturers at the start of the course to agree on the modalities of the independent study.
Specific Educational Objectives and Learning Outcomes	Knowledge and understanding Know the fundamental principles and programming techniques of operating and real-time systems; Know the innovative aspects of the last generation of operating systems. Applying knowledge and understanding Ability to develop programs to interact with microcontrollers and the operating systems of modern computers. Making judgements Be able to work autonomously according to the own level of knowledge and understanding. Communication skills Be able to use one of the three languages English, Italian and German, and be able to use technical terms and communication appropriately. Ability to learn Have developed learning capabilities to pursue further studies with a high degree of autonomy.
Specific Educational Objectives and Learning Outcomes (additional info.)	Students gain an understanding of the theoretical and practical concepts of operating systems with a focus on the algorithmic aspects orchestrating the underlying hardware structure of a computer and the basic parallel programming techniques. After this

	course the students are able to understand the main principles for designing an OS, operate on an OS through a terminal, and develop code with elements of parallelism.
Assessment	Written exam. The mark for each part of the exam is 18-30, or insufficient. The written exam comprises verification questions and open questions to test knowledge application skills on the arguments discussed during the course. In case of doubts on the final mark. the lecturer reserves the right to ask for an additional oral examination. The oral exam comprises verification questions and open questions to test knowledge application skills. It can increase or decrease the mark obtained in the written exam.
Evaluation Criteria	The final mark is computed in proportion of the correct answers given in the written exam. The optional oral exam can increase or decrease the mark obtained in the written exam. Relevant for the oral exam: clarity of answers, ability to recall principles and methods, and deep understanding about the course topics presented in the lectures. Non-attending students have the same evaluation criteria and requirements for passing the exam as attending students.
Required Readings	Silberschatz, P. B. Galvin, G. Gagne, Operating Systems Concepts
Supplementary Readings	Web resources provided by the lecturer during the lectures
Further Information	Software used: C compiler and debugger, Bash shell, GNU/Linux
Sustainable Development Goals (SDGs)	Quality education