Anno Accademico 2021/2022

HARDWARE SOFTWARE CODESIGN	
Anno immatricolazione	2020/2021
Anno offerta	2021/2022
Normativa	DM270
SSD	ING-INF/05 (SISTEMI DI ELABORAZIONE DELLE INFORMAZIONI)
Dipartimento	DIPARTIMENTO DI INGEGNERIA INDUSTRIALE E DELL'INFORMAZIONE
Corso di studio	ELECTRONIC ENGINEERING
Curriculum	Microelectronics
Anno di corso	2°
Periodo didattico	Secondo Semestre (07/03/2022 - 17/06/2022)
Crediti	6
Ore	45 ore di attività frontale
Lingua insegnamento	English
Tipo esame	SCRITTO
Docente	RUBINI ALESSANDRO (titolare) - 6 CFU
Prerequisiti	Students are expected to have some basic knowledge of computer science and electrical stuff. They should be able to write a software program, understand the internals of a computer and know by heard Ohm's law, impedance and similar ideas. I appreciate if attendees are interested (or better passionate) in the subject matter. You are expected to be brave enough to raise your hand and express a different opinion whenever my point of view seems questionable.
Obiettivi formativi	The class aims at understanding the various issues that lead from the idea to the complete microcontroller system. We need to design hardware thinking about the software, and vice versa. We'll understand the whole software toolchain in the freestanding environment (i.e., non-hosted), uncluding some special features of the compiler and linker that are routinely used in the best practices of this

	field.
Programma e contenuti	After an almost-democratic choice of the PCB we'll realize, the course will cover the design of the PCB and the writing of the software image that together will build up to the complete system. The system is based on Cortex-M and code is written in C language. At the end of the class, each attendee will keep a specimen of the device we designed and programmed. Specific topics, almost unsorted, may be the following ones: - Git (version management) - Kicad (schematics) - Kicad (PCB design) - Compiler, assembler, linker - Initialization of a CPU - Memory management - Time management - Scheduling - Interrupts and locking - Data structures - ELF sections - Debug - GPIO, I2C, SPI, UART - Interfacing with the PC Whenver I refer to a specific product, I'm interested more in theideas than specific features of the tool. We'll always use free software, without any licencing cost nor "free student licence" to create addiction.
Metodi didattici	
Testi di riferimento	None. Reference material (original or already available) will be available at no cost. According to the project we'll choose to build and to the number of items, I may ask to contribute components, for a cost lower than any tecnical book.
Modalità verifica apprendimento	
Altre informazioni	....
Obiettivi Agenda 2030 per lo sviluppo sostenibile	$lbl_legenda_sviluppo_sostenibile