COURSE DESCRIPTION – ACADEMIC YEAR 2019/2020

Course title	**C Programming for Microelectronics**
Course code	76054
Scientific sector	ING-INF/01
Degree	Master in Software Engineering for Information Systems (LM-18)
Semester	1
Year	1
Credits	6
Modular	No

Total lecturing hours	36
Total exercise hours	24
Attendance	Lecture attendance is very strongly recommended.
Prerequisites	Registration for the course of Master in Software Engineering for Information Systems (LM-18)
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type caratterizzanti – discipline informatiche and is part of the Specialization Topics. The course will provide an introduction to basic concepts in information and computer science (hardware and software), particularly in topics of fundamental importance to engineering.

Lecturer	Karl von Ellenrieder
Contact LA	Facoltà di Scienze e Tecnologie, Building K, Room 2.08 karl.vonellenrieder@unibz.it, tel +39 0471 017172
Scientific sector of lecturer	ING-INF/04
Teaching language	English
Office hours	As listed on Cockpit or by appointment
Lecturing Assistant (if any)	Moraschini Marco
Contact LA	Marco.Moraschini@unibz.it
Office hours LA	Arranged beforehand by email
List of topics	The course covers the following topics: 1. Basic programming syntax and structure in C 2. Functions 3. Conditional control structures 4. Arithmetic, comparison and Boolean operators 5. Pointers and addressing 6. Data types 7. Interrupts 8. Simple electronic circuits
Teaching format	Classroom lectures and laboratory exercises

Learning outcomes	Knowledge and understanding D1.1 To have a sound knowledge of both the fundamentals and the application aspects of the various core areas of information technology; specifically the following: 1. Basic software design procedures. 2. How to develop simple microprocessor programs.

	3. How to interface a microprocessor with simple sensors and actuators. 4. How to implement simple electro-mechanical systems. Applying knowledge and understanding D2.2 To be able to design and perform experimental analyses of information systems in order to acquire measures related to their behaviour and to evaluate experimental hypotheses in different fields of application, such as business, industrial or research; D2.3 To know how to apply the principles of software engineering to domains of different complexity, both IT and non-IT, in which software technology is of great importance, such as, for example, in the transport sector or in the medical field; D2.4 To be able to define an innovative technical solution to an application problem that meets technical, functional and organisational constraints and requirements; Making judgements D3.2 To be able to plan and re-plan a technical project activity and to carry it out in accordance with defined deadlines and objectives; D3.3 To be able to define work objectives compatible with the time and resources available; D3.4 To be able to reconcile the objectives of the project that are in conflict, to trade-off cost, resources, time, knowledge or risk; Communication skills D4.3 To be able to structure and draft scientific and technical documentation describing project activities; D4.4 To be able to coordinate project teams and to identify activities to achieve project objectives; D4.6 To be able to interact and collaborate during the implementation of a project or research with peers and experts; D4.7 To be able to carry out research and projects in collaborative manner; Learning Skills D5.3 In the context of a problem solving activity, to be able to extend knowledge, even if incomplete, taking into account the final objective of the project;
Assessment	• Written final exam with verification questions • Laboratory work: conducting experiments in groups; submitting individual laboratory reports with an evaluation of results obtained **Note**: in order for a student's lab report to be accepted for marking, the student must have been physically present at the corresponding laboratory session.

Formative assessment

Form	%	Length / duration	ILOs assessed
Labs	40	24 hours total	1-7

Summative assessment

Form	%	Length / duration	ILOs assessed
Final Exam	60	4 hours	1-4,6,8

Assessment language	English
Assessment typology	Monocratic
Evaluation criteria and criteria for awarding marks	Labs: Completeness and correctness of reports; quality of writing; level of observation of physical processes; ability to summarize in own words Written Final Exam: Completeness, clarity and correctness of answers. Students are required to receive an overall grade of greater than 60/100 points in order to pass the course.

Required readings	Smith, A. G. *Introduction to Arduino: A piece of cake*, CreateSpace Independent Publishing Platform, 2011. ISBN: 978-1463698348 Hardcopies are available in library reserves, or can be downloaded at no cost from the publisher at the following link - http://www.introtoarduino.com/downloads/IntroArduinoBook.pdf Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it
Supplementary readings	Blum, J. Exploring Arduino: Tools and Techniques for Engineering Wizardry, John Wiley & Sons, 2013. ISBN: 978-1-118-54936-0
Software used	The open-source Arduino Software (IDE), downloadable from https://www.arduino.cc/en/Main/Software **Note**: You should bring your own laptop or work in a group with another student who has his/her own laptop. It is not possible to connect with the microprocessor hardware using one of the UniBZ Library's networked computers.