Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Grundlagen der Informatik und der Microcontroller-Programmierung
Code der Lehrveranstaltung	42174
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	IINF-04/A
Sprache	Englisch
Studiengang	Bachelor in Industrie- und Maschineningenieurwesen
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	dr. Davide Carminati, Davide.Carminati@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/55216
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	1
KP	6
Vorlesungsstunden	36
Laboratoriumsstunden	24
Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	18
Inhaltsangabe	- Basics of programming in the C/C++ language - Introductory analog and digital electronics - Introductory motor control and sensor reading - Introduction to computer architecture
Themen der	The course will introduce basic concepts in information and

Lehrveranstaltung	computer science (hardware and software), particularly those topics of fundamental importance to Engineering and confirm the theoretical learnings in lab projects and class assignments.
Stichwörter	Electronics, programming, microcontroller
Empfohlene Voraussetzungen	
Propädeutische Lehrveranstaltungen	
Unterrichtsform	Frontal lectures and lab and coding exercises.
Anwesenheitspflicht	Attendance at assigned laboratory sections is required; lecture attendance is very strongly recommended.
Spezifische Bildungsziele und erwartete Lernergebnisse	Intended Learning Outcomes (ILO) Knowledge and understanding Through the application of the principles of Information Science and Microcontroller Programming, students should be able: 1. To know basic software design procedures. 2. To know how to develop simple microcontroller programs. 3. To understand how to interface a microcontroller with simple sensors and actuators. 4. To understand the principles of simple electromechanical systems. Applying knowledge and understanding 5. To apply software design principles, programming, and hardware interfacing in theoretical examples and hands-on laboratory exercises that complement the lectures and sustain arguments. Making judgments 6. To make autonomous judgments on the choice of the right tools such as data types, programming approaches, or electrical components. The labs will also require students to gather and interpret relevant data. Communication skills 7. To correctly and properly present information, ideas, problems, and solutions during the labs. Learning skills 8. To acquire extended skills in Information Science and Microcontroller Programming and be able to use this new knowledge as a solid foundation for further study in more

	advanced courses in Engineering.
Spezifisches Bildungsziel und erwartete Lernergebnisse (zusätzliche Informationen)	
Art der Prüfung	Examination of the course is conducted via a written exam and lab. The written exam consists of two parts: i) a part with short questions to assess the knowledge and understanding of the theoretical fundamentals of the course topics. ii) a part with exercises on Datatypes and Operations, exercises on the dimensioning of electrical circuits, as well as exercises on code writing. The single experiments of the lab will be examined by i) the correct functionality of the student's own implementation as described in the relative task description ii) the ability of the single students in the lab groups to explain the selected approaches iii) the level of observation of physical processes iv) the overall implementation, documentation, and appearance of the electrical circuit and software code of the selected approach. Formative assessment: Labs: max 8/30 points; ILOs assessed: 1-7; Summative assessment: Written exam: max 25/30 points (3-4 hours); ILOS assessed: 1-4,6,8;
Bewertungskriterien	Written Final Exam: Completeness and correctness of answers. Labs: Completeness and correctness of the student's own implementation, the ability of students to explain the selected approaches, the level of observation of physical processes, and the overall implementation, documentation, as well as appearance of the electrical circuit and software code of the selected approach. Students are required to receive an overall grade of greater than 18/30 points in order to pass the course.
Pflichtliteratur	Smith, A. G. Introduction to Arduino: A piece of cake, CreateSpace Independent Publishing Platform, 2011. ISBN: 978-1463698348 Hard copies available in library reserves, or can be downloaded

	here – http://www.introtoarduino.com/downloads/IntroArduinoBook.pdf Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it and Ilaria Miceli, Ilaria.Miceli@unibz.it
Weiterführende Literatur	Blum, J. Exploring Arduino: Tools and Techniques for Engineering Wizardry, John Wiley & Sons, 2013. ISBN: 978-1-118-54936-0
Weitere Informationen	Software used: Arduino IDE freely available at: https://www.arduino.cc/en/software It needs to be installed on the student's personal laptop. The Ubuntu operating system is recommended, but MacOS or Windows with WSL are also acceptable.
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung