Syllabus

Kursbeschreibung

Titel der Lehrveranstaltung	Algorithmen und Programmierung
Code der Lehrveranstaltung	42407
Zusätzlicher Titel der Lehrveranstaltung	
Wissenschaftlich-disziplinärer Bereich	ING-INF/05
Sprache	Italienisch
Studiengang	Bachelor in Elektrotechnik und Cyber-Physische Systeme
Andere Studiengänge (gem. Lehrveranstaltung)	
Dozenten/Dozentinnen	Dr. Sergio Tessaris, Sergio.Tessaris@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/2315 dr. Ivan Donadello, Ivan.Donadello@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/45237
Wissensch. Mitarbeiter/Mitarbeiterin	
Semester	Erstes Semester
Studienjahr/e	2
KP	6
Vorlesungsstunden	40
Laboratoriumsstunden	20
Stunden für individuelles Studium	90
Vorgesehene Sprechzeiten	18
Inhaltsangabe	• Searching and sorting • Analysis of algorithms: correctness and complexity • Divide and conquer, recurrences

	• Pointers, dynamic data structures, linked lists • Abstract data types: stacks, queues, priority queues, maps • Elementary graph and tree algorithms
Themen der Lehrveranstaltung	• Ricerca e ordinamento • Analysis of algorithms: correctness and complexity • Divide and conquer, recurrences • Pointers, dynamic data structures, linked lists • Abstract data types: stacks, queues, priority queues, maps • Elementary graph and tree algorithms
Stichwörter	Ricerca e ordinamento; Data structures and algorithms; Analysis of algorithms; Recurrences; Algoritmi su grafi
Empfohlene Voraussetzungen	• Java/C programming skills at an introductory level • Basic mathematical knowledge about sets, relations, discrete mathematics, mathematical functions (logs and exponentials), series and and differential calculus.
Propädeutische Lehrveranstaltungen	
Unterrichtsform	Frontal lectures and labs
Anwesenheitspflicht	Attendance is not compulsory, but strongly recommended. The lectures consist of presentations, interspersed by small exercises, and discussions with the students. The goal of the course is to enable students to develop and analyze algorithms, which is a skill that can only be acquired by training. All the material used in the lectures and labs will be published on the OLE pages of the course. Attendance to lectures and labs is strongly recommended.
Spezifische Bildungsziele und erwartete Lernergebnisse	Knowledge and understanding: • D1.3 - Know the basic principles of programming. • D1.6 - Know the most important data structures and their use in programming languages. Applying knowledge and understanding: • D2.2 - Ability to solve algorithmic problems using programming methods. Learning skills • D5.1 - Learning ability to undertake further studies with a high degree of autonomy.
Spezifisches Bildungsziel und erwartete	The course belongs to the type "attività formative di base – informatica di base".

Lernergebnisse (zusätzliche Informationen)	By following this course, students will be able to formulate algorithmic problems and to recognize algorithmic problems underlying an application. They will also acquire an in-depth understanding of the standard data structures and the corresponding algorithmic techniques to solve such problems. They will recognize how certain algorithmic approaches depend on the choice of a suitable data structure and vice versa. Moreover, students will learn how to analyze whether an algorithm is correct and which time and space resources it needs. Finally, students will learn how to compare different algorithms with respect to their suitability for a given application.
Art der Prüfung	The assessment is based on a written final exam. The written exam consists of questions to verify knowledge, questions that assess the ability to apply knowledge acquired in the course, and exercises
Bewertungskriterien	There are no requirements for attending the final exam. In the written exam, students have to apply techniques taught in the course in a defined setting and have to develop algorithms for new problems. The algorithms developed have to be analyzed with respect to correctness and efficiency. The answers are marked according to their correctness, the suitability of the algorithms developed, and the validity and clarity of the analysis.
Pflichtliteratur	Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein (CLRS), 2nd or 3rd edition University Library: ST 134 C811
Weiterführende Literatur	Algorithms and Data Structures - The Basic Toolbox, K. Mehlhorn and P. Sanders, free download from http://www.mpi-inf.mpg.de/~mehlhorn/ftp/Mehlhorn-Sanders-Toolbox.pdf
Weitere Informationen	Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it Software used: Java/C compiler and debugger
Ziele für nachhaltige Entwicklung (SDGs)	Hochwertige Bildung