Syllabus

Course Description

Course Title	Discrete Mathematics
Course Code	76239
Course Title Additional	
Scientific-Disciplinary Sector	MATH-01/A
Language	English
Degree Course	Bachelor in Computer Science
Other Degree Courses (Loaned)	
Lecturers	Prof. Dr. Oliver Kutz, Oliver.Kutz@unibz.it https://www.unibz.it/en/faculties/engineering/academic-staff/person/35483
Teaching Assistant	
Semester	First semester
Course Year/s	1
CP	6
Teaching Hours	40
Lab Hours	20
Individual Study Hours	90
Planned Office Hours	18
Contents Summary	• Elements of logic, propositions and quantifiers, methods of mathematical proof • Basic number theory and the Induction Principle • Set Theory, Russell Paradox and Halting Problem • Functions, infinite cardinalities and countability • Relations, orders, equivalence classes • Graphs and trees
Course Topics	The aim of this course is to introduce students to basic topics in discrete mathematics. An overview of proof methods and their relation to logic will be given. The induction principle is introduced

	in a number of variants, and methods to analyse and describe the main properties of relations, functions, graphs and trees will be studied. We will also introduce the basic principles governing the mathematical definitions of infinite sets and of countability.
Keywords	Logic and proof, number theory and sets, functions and cardinality, relations and orders, graphs and trees
Recommended Prerequisites	There are no prerequisites for this course.
Propaedeutic Courses	
Teaching Format	The course includes frontal lectures and lab exercises.
Mandatory Attendance	Attendance is not compulsory but recommended. Non-attending students have to contact the lecturer at the start of the course to agree on the modalities of the independent study.
Specific Educational Objectives and Learning Outcomes	Knowledge and Understanding - D1.1: Have a solid knowledge of mathematical analysis, algebra, numerical calculus, discrete mathematics and elementary notion of logic that are in support of computer science Applying knowledge and understanding - D2.1: Be able to use the tools of mathematics and logic to solve problems. Ability to make judgments - D3.2: Be able to work autonomously according to the own level of knowledge and understanding. Communication skills - D4.1: Be able to use one of the three languages English, Italian and German, and be able to use technical terms and communication appropriately. Learning skills - D5.1: Have developed learning capabilities to pursue further studies with a high degree of autonomy.
Specific Educational Objectives and Learning Outcomes (additional info.)	
Assessment	The written exam includes verification questions, knowledge transfer tasks, and exercises.

Evaluation Criteria	Final written exam counting 100% for the evaluation and covering the full program of the course. Written exam questions will be evaluated in terms of correctness, clarity, quality of argumentation, and problem solving ability.
Required Readings	Susanna Samuels Epp. Discrete Mathematics with Applications. Cengage Learning, 5th edition, 01 2019. ISBN 978-1337694193. URL: https://www.cengage.com/c/discrete-mathematics-with-applications-5e-epp/9781337694193.
Supplementary Readings	K.H. Rosen and K. Krithivasan. Discrete Mathematics and Its Applications: With Combinatorics and Graph Theory. McGraw-Hill Companies, 2012. ISBN 9780070681880.
Further Information	If the use of specific software is required, it will be communicated during class by the lecturer.
Sustainable Development Goals (SDGs)	Quality education