

CORSO DI LAUREA IN INFORMATICA

Piano di studio, contenuto degli insegnamenti e corrispondenza con i risultati di apprendimento

BACHELOR IN INFORMATIK

Studienplan, Inhalt der Kurse und Übereinstimmung mit den Leistungs- und Fähigkeitserwartungen

Corso di laurea in Informatica - Piano di Studio / Bachelor in Informatik-Studienplan

1. Allocazione degli insegnamenti per anno di corso e per semestre / Aufteilung der Lehrveranstaltungen nach Studienjahr und Semester

Ogni anno di corso è articolato in due semestri. L'inizio e la fine dei semestri sono stabiliti nel Calendario Accademico. I corsi hanno durata semestrale o annuale.

Jedes Studienjahr ist in zwei Semester unterteilt. Anfang und Ende der Semester sind im Akademischen Kalender festgelegt. Die Lehrveranstaltungen haben eine Dauer von einem Semester oder sind Ganzjahreskurse.

La seguente tabella rappresenta il piano di studio e la pianificazione su 3 anni, ovvero 6 semestri.

Die nachfolgende Tabelle zeigt den Studienplan und die Aufteilung in 3 Jahren bzw. 6 Semester.

Insegnamento/Lehrveranstaltung	CFU/KP	Esame/Prüfung
Primo anno / Erstes Jahr		
Semestre / Semester 1		
Linear Algebra	6	Si/Ja
Discrete Mathematics	6	Si/Ja
Computer Programming	9	Si/Ja
Computer Systems Architecture	6	Si/Ja
English for Computer Scientists 1	3	Si/Ja
Semestre / Semester 2		
Analysis	6	Si/Ja
Operating Systems	6	Si/Ja
Web and Internet Engineering	6	Si/Ja
Programming Project	9	Si/Ja
English for Computer Scientists 2	3	Si/Ja
Secondo anno / Zweites Jahr		
Semestre / Semester 3		
Data Structures and Algorithms	9	Si/Ja
Introduction to Databases	6	Si/Ja
Probability Theory and Statistics	6	Si/Ja
Maker Lab	3	Idoneità/Eignung
Italian for Computer Scientists / German for Computer Scientists	6	Si/Ja
Semestre / Semester 4		
Database Management Systems	6	Si/Ja
Formal Languages and Compilers	6	Si/Ja
Software Engineering	6	Si/Ja
Applied Computer Science 1	12	Si/Ja
Terzo anno / Drittes Jahr		

Corsi annuali / Ganzjahreskurse		
Free Choice/Internship	12	*
Semestre/Semester 5		
Applied Computer Science 2	12	Si/Ja
Computer Networks	6	Si/Ja
Computational Security Module 1: Computational Mathematics	6	Si/Ja
Semestre / Semester 6		
Computational Security Module 2: Information Security	6	Si/Ja
Project and Teamwork Management	3	Idoneità/Eignung
Scientific Writing and Communication	3	Idoneità/Eignung
Introduction to Business Administration	3	Idoneità/Eignung
Internship/Project for Thesis	6	
Thesis	3	

* Io/la student/ssa può scegliere insegnamenti che prevedono sia esami di profitto che prove di idoneità

* Der/ die Student/inn kann Veranstaltungen wählen die sowohl Erfolgsprüfungen als Eignungsprüfungen voraussehen

Applied Computer Science Areas		
Insegnamento/Lehrveranstaltung	CFU/KP	Esame/Prüfung
Software and System Engineering		
Software Architecture - Module 1: Software Systems Architecture - Module 2: Tools and Techniques for Software Testing	12	Si/Ja
Mobile and Physical Systems - Module 1: Engineering of Mobile Systems - Module 2: Physical Computing Project	12	Si/Ja
Intelligent Systems		
Artificial Intelligence - Module 1: Foundation of Artificial Intelligence - Module 2: Machine Learning in Practice	12	Si/Ja
Intelligent Agents - Module 1: Knowledge Representation - Module 2: Intelligent Agents Project	12	Si/Ja

2. Tipologia delle attività formative

2.1 Attività formative di base / Grundvorlesungen

2.1.1 Formazione matematica-fisica / Ausbildung in Mathematik und Physik

Insegnamento e contenuto / Lehrveranstaltung und Inhalt	CFU / KP	SSD
Linear Algebra - Background on complex numbers, trigonometry and polynomials - Vectors and matrices: - Linear Systems	6	MAT/02

• vector spaces: • Linear operators • Spectral analysis		
Analysis • Sequences and series • Univariate functions • Derivatives, differentials and Taylor Theorem • Riemann integral • Logarithmic and exponential functions • Normed vector spaces	6	MAT/05
Discrete Mathematics • Elements of logic, propositions and quantifiers, methods of mathematical proof • Numbers and basic number theory • Set Theory, Russell Paradox and Halting Problem • Functions, infinite cardinalities and countability • Relations, orders, equivalence classes • Graphs and trees	6	MAT/01

2.1.2 Formazione informatica di base / Grundlagen der Informatik

Computer Programming • Basic algorithms and data structures • Data types and expressions • Classes and objects • Conditionals and loops • Object-oriented design • Arrays and collections • Input/Output and exception handling • Inheritance and polymorphism • Recursion	9	INF/01
Computer Systems Architecture • Computer systems organization: processors, primary memory, secondary memory, input/output and parallel architectures. • Boolean algebra and gates: Boolean algebra, gates, implementation of Boolean functions, circuit equivalence. • Digital circuits: arithmetic circuits, clocks, memory, CPU chips, buses. • Microarchitecture: design of the microarchitecture level, performance optimization. • Instruction sets: data types, instruction formats, addressing, instruction types, flow of control. • Introduction to Assembly language	6	INF/01
Operating Systems • Programming in C • Scheduling and concurrency • Processes and synchronization • File systems and memory management • Storage management • Security and protection	6	ING-INF/05
Data Structures and Algorithms • 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	9	INF/01

• Trees, red-black trees • Hashing • Graph algorithms • NP-completeness		

2.2 Attività formative caratterizzanti / Fachtypische Bildungstätigkeiten

2.2.1 Discipline informatiche / Fachrichtungen der Informatik

Database Management Systems • Physical data storage • Indexing and hashing • Query processing and optimization • Transaction processing • Concurrency control • Recovery	6	INF/01
Formal Languages and Compilers • Formal language theory • Regular languages: automata, regular expressions, regular grammars • Context free languages (stack machines) • Lexical and syntactic analysis: Lexer specification, top-down and bottom-up parsing • Semantic analysis: Syntax Directed Translations Vs. Translation schemes • Symbol tables: Data structures and Semantic Rules	6	INF/01
Introduction to Databases • Relational data model and relational algebra • The SQL language • Using SQL in database applications: API, embedded SQL • The Entity Relationship model • Conceptual database design • Logical database design	6	ING-INF/05
Programming Project • Memory models in Java • Virtual functions, late binding, overriding, and overloading • Exception handling • Reflection and runtime type identification • Generics and templates • I/O, serialization and XML/JSON processing • Designing large applications: design patterns, advanced GUI • Multithreading • Code optimization	9	INF/01
Software Engineering • Software life-cycle: principles and methodologies • Software processes and software project management • Requirements engineering: elicitation and modeling • System modeling and construction: UML, design patterns • Software testing: principles and techniques • Software management and evolution	6	INF/01
Web and Internet Engineering • Development of web applications: basics of usability, accessibility and	6	INF/01

- responsive design • Web protocols and markup languages • Client-side dynamicity and web scripting languages • Client-side GUI frameworks • Web application design and web services • Languages and frameworks for server-side web development		
Computer Networks • Introduction to computer networks • ISO OSI reference model • Internet applications and application protocols (HTTP, SMTP, DNS) • Network protocols: TCP/IP, Ethernet • Sockets and RPCs • Failure robustness, security	6	ING-INF/05
Applied Computer Science • Vedi punto 4.5	24	INF/01

2.3 Attività formative affini o integrative / Benachbarte oder zusätzliche Bildungstätigkeiten

Probability Theory and Statistics • Basic concepts: probability spaces, conditional probability, Bayes' Theorem, independent events • Random variables: distribution, density, expectation, variance, covariance, law of large numbers • Special distributions: Bernoulli, Binomial, Poisson, Exponential, Normal, Chi-Square, t-Distribution • Sampling: sums of random variables, central limit theorem, sample variance • Descriptive statistics and inference: data analysis, parametric inference, normality • Statistical models: hypothesis testing, linear models, regression, least square method	6	MAT/06
Computational Security	12	ING-INF/05
Module 1: Computational Mathematics • Principles of finite precision computation • Direct methods for solving linear systems • Iterative methods for linear algebra • Singular value decomposition • Rootfinding methods for solving nonlinear equations • Functional approximation	6	MAT/08
Module 2: Information Security • Basic definitions: CIA, threat, attack, vulnerability, access control • Risk assessment • Basics of cryptography • Network attack and defense • Usability • Security policies	6	MAT/08

2.4 Ulteriori attività formative / Zusätzliche Ausbildungstätigkeiten

Maker Lab • Basics of programming for physical computing and interactions with the world using Python 3 • Basics of electronics for physical computing: interruptors, sensors, actuators and hats • Basics of interaction design and development for physical computing	3	ING-INF/01
Project and Teamwork Management	3	M-FIL/02

• Project and team work management methods and techniques: goal specification techniques, coordination and collaboration techniques, performance and risk management • Human resources management: communication, conflict management • Tool support for project and team work management		
Introduction to Business Administration • Introduction to management: company overview and business functions, capital configuration, company equilibrium, organizational dynamics • Accrual Accounting and Financial Statements • Managerial accounting for decision making (costing and pricing), planning, budgeting and reporting	3	SECS-P/07
Scientific Writing and Communication • Presentation techniques: structure of presentations, interacting with PowerPoint, slide design, body language and positioning, presentation of participants, feedback • Communication techniques: structure of presentations, interacting with PowerPoint, slide design, body language and positioning, presentation of participants, feedback • Scientific writing: academic language, structure of scientific documents, scientific sources, thesis writing	3	M-FIL/02

3 Insegnamenti di specializzazione / Spezialisierungskurse

Il corso di laurea prevede la specializzazione in una di due aree applicative. Ciascun'area comprende quattro insegnamenti dedicati all'utilizzo dei sistemi informatici in un determinato campo applicativo. Gli insegnamenti appartenenti a queste aree sono attività formative caratterizzanti.

Der Studiengang sieht eine Spezialisierung in einem der zwei Anwendungsbereiche vor. Jeder Bereich umfasst vier Lehrveranstaltungen, welche auf den Einsatz von IT-Systemen in einem bestimmten Sektor ausgerichtet sind. Lehrveranstaltungen aus diesen Bereichen gehören den fachtypischen Bildungstätigkeiten an.

Entro la fine del terzo semestre lo studente sceglie un'area e di conseguenza sostiene gli insegnamenti appartenenti all'area scelta.

Innerhalb des dritten Semesters entscheidet sich der Studierende für einen Bereich und besucht die diesem Bereich zugehörenden Lehrveranstaltungen.

Le aree di applicazione sono le seguenti:

- Software and Systems Engineering
- Intelligent Systems

Die Anwendungsbereiche sind:

- Software and Systems Engineering
- Intelligent Systems

3.1 Software and Systems Engineering

Software Architecture	12	INF/01
Module 1: Software Systems Architecture • Software and systems architecture principles • Architecture process and activities: specification, validation • Architectural description and modeling • Stakeholders and viewpoints • Quality considerations: security, performance, modifiability • Patterns of systems architectures	6	INF/01
Module 2: Tools and Techniques for Software Testing • Techniques for black box and white box testing	6	INF/01

• Automated testing • Dynamic Testing • Static testing • Performance and monitoring • Introduction to search-based testing		
Mobile and Physical Systems	12	INF/01
Module 1: Engineering of Mobile Systems • Functional and declarative programming • Design of mobile applications • Frameworks and platforms for mobile development • Data and resource management in a mobile context • Mobile device sensors • Internet of Things	6	INF/01
Module 2: Physical Computing Project • Introduction to interaction design for physical computing • Physical computing hardware for interactive solutions • Physical computing software for interactive solutions • Ideation and conceptualisation of physical computing solutions • Development of physical computing solutions • Evaluation of physical computing solutions	6	INF/01

3.2 Intelligent Systems

Artificial Intelligence	12	INF/01
Module 1: Foundation of Artificial Intelligence • Artificial Intelligence and Agents • Searching for Solutions • Reasoning with Constraints • Propositions and inference • Planning with Certainty • Multiagent Systems and Games	6	INF/01
Module 2: Machine Learning in Practice • Feature Extraction • Frequent Pattern Recognition • Linear Regression • Rule-based Classification and Decision Trees • Bayesian Classifiers • K-Means Clustering	6	INF/01
Intelligent Agents	12	INF/01
Module 1: Knowledge Representation • Individuals and Relations • Knowledge Representation and Logic • Model Theory • Theorem Proving • Ontologies and Knowledge-Based Systems • Planning with Individuals and Relations	6	INF/01
Module 2: Intelligent Agents Project • Overview of the main AI techniques: exact and approximate methods, handling imperfect information, use and model domain knowledge. • Tools for development of AI systems	6	INF/01

• Functional and Logic Programming languages for AI • AI programming techniques • Projects on AI topics, such as: knowledge representations, games, automated planning, applications of constraint solving, multiagent systems		
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4 Corsi curriculari di lingua / Curriculare Sprachkurse

Il piano di studio prevede tre insegnamenti di lingua obbligatori (12 CFU in totale).

Der Studienplan sieht drei obligatorische Sprachlehrveranstaltungen vor (12 KP insgesamt).

Gli insegnamenti "English for Computer Scientists 1" di 3 CFU e "English for Computer Scientists 2" di 3 CFU; sono obbligatori per tutti gli studenti.

Die Lehrveranstaltungen „English for Computer Scientists 1“ zu 3 KP und die Lehrveranstaltung „English for Computer Scientists 2“ zu 3 KP, sind für alle Studierenden verpflichtend.

Il secondo insegnamento di lingua di 6 CFU dipende dalla lingua principale della scuola superiore dello studente.

Die zweite Sprachlehrveranstaltung zu 6 KP ist von der Hauptunterrichtssprache von der Oberschule des Studierenden abhängig.

Se la lingua principale era il tedesco, lo studente deve sostenere l'insegnamento di italiano.

Wenn die Hauptunterrichtssprache Deutsch war, muss der Studierende den Italienischkurs besuchen.

Se la lingua principale era l'italiano, lo studente deve sostenere l'insegnamento di tedesco.

Wenn die Hauptunterrichtssprache Italienisch war, muss der Studierende den Deutschkurs besuchen.

Se la lingua principale non era né il tedesco né l'italiano, lo studente può scegliere quale dei due corsi sostenere.

Wenn die Hauptunterrichtssprache weder Deutsch noch Italienisch war, kann der Studierende wählen, welchen der zwei Kurse er besucht

Insegnamento e contenuto/ Lehrveranstaltung und Lehrinhalte	CFU/KP	SSD
English for Computer Scientists 1 • General overview of grammatical structures at the C1 level; • Development of receptive skills through the exposure to and analysis of various types of written and spoken discourse typical in Computer Science and development of grammatical and lexical range and accuracy so that communication is fluent and spontaneous; • Vocabulary acquisition and word-building techniques; lexicogrammar.	3	L-LIN/12
English for Computer Scientists 2 • Study skills: focus on developing the specific study skills that are required in this undergraduate programme in Computer Science including critical thinking skills; • Writing skills: practice of coherent academic discourse to produce subject-specific texts in English at the C1 level, including formal academic emails, reports and summaries; • Spoken skills: improvement of spoken interaction and production through the practice and production of academically and professionally acceptable presentations and other domain-specific speaking activities.	3	L-LIN/12
German for Computer Scientists • Listening skills: comprehension of talks, documentary, reportings, descriptions in different contexts, on different media, about ICT topics • Writing skills: practice of coherent academic discourse to produce subject-specific texts (for example application letter, report, product review,	6	L-LIN/14

compliant mail, instructions, essay, abstract, summary, seminar work etc.) about ICT topics; • Spoken skills: improvement of spoken interaction and production through the practice and production of academically and professionally acceptable presentations and other domain-specific speaking activities; • Development of receptive skills (reading and listening, both global and detailed) through the exposure to and analysis of various types of authentic written and spoken discourse typical in Computer Science and development of grammatical and lexical range and accuracy so that communication is fluent and spontaneous; • Language mediation (mediating communication, text and concepts) from English to German and viceversa about area of expertise (ICT); • Vocabulary acquisition and word-building techniques; lexicogrammar.		
Italian for Computer Scientists • Listening skills: comprehension of talks in different contexts, live, by phone or other media, about ICT topics • Writing skills: practice of coherent academic discourse to produce subject-specific texts; practice of all communication texts, such as e-mails, web texts; • Spoken skills: improvement of spoken interaction and production through the practice and production of academically and professionally acceptable presentations and other domain-specific speaking activities; • Development of receptive skills through the exposure to and analysis of various types of written and spoken discourse typical in ICT and development of grammatical and lexical range and accuracy so that communication is fluent and spontaneous; • Language mediation (mediating communication, text and concepts) from English to German and viceversa about area of expertise (ICT); • Vocabulary acquisition and word-building techniques; lexicogrammar.	6	L-FIL-LET/12

5 Insegnamenti a scelta dello studente (Free Choice) / Wahlfächer (Free Choice)

Lo studente deve scegliere liberamente delle attività formative (lezioni, tirocini e progetti) per un totale di 12 crediti formativi universitari.

Le attività formative devono essere approvate dal Consiglio di Corso di Laurea che verifica la coerenza con il percorso formativo dello studente.

Il Consiglio di Corso di Laurea approva annualmente una lista di attività formative Free Choice la cui coerenza con il percorso formativo è già stata verificata. Per tali attività non è necessaria approvazione.

Il tirocinio o un progetto free choice può avere un numero di crediti compreso tra 6 e 12 crediti formativi universitari.

Der Studierende muss frei Lehrveranstaltungen (Vorlesungen, Praktika und Projekte) für insgesamt 12 Kreditpunkte wählen.

Die Lehrveranstaltungen müssen vom Studiengangsrat genehmigt werden, der die Kohärenz zum Studienprogramm des Studierenden überprüft.

Der Studiengangsrat genehmigt jährlich eine Liste von Free Choice Lehrveranstaltungen, für welche die Kohärenz zum Studienprogramm bereits überprüft worden ist. Für diese Lehrveranstaltungen ist keine Genehmigung erforderlich.

Für das Wahlfach-Praktikum oder -Projekt können 6 bis 12 Kreditpunkte vergeben werden.

6 Propedeuticità e corsi di sostegno extracurricolari / Propädeutik und extra-curriculare Aktivitäten

6.1 Propedeuticità di Linear Algebra e Computer Programming / Propädeutik von Linear Algebra und Computer Programming

Gli esami degli insegnamenti "Linear Algebra" e "Computer Programming" al primo anno sono propedeutici agli esami degli anni successivi. Lo studente che non supera tali esami entro il primo anno può iscriversi agli anni successivi, ma non può sostenere i relativi esami finché non avrà superato gli esami propedeutici.

Die Prüfungen „Linear Algebra“ und „Computer Programming“ im ersten Jahr sind für die Prüfungen der nachfolgenden Jahre propädeutisch. Der Student, der diese nicht innerhalb des ersten Jahres besteht, kann sich in die nachfolgenden Jahre einschreiben, jedoch keine Prüfungen ablegen bis er die propädeutischen Prüfungen bestanden hat.

7 Organizzazione didattica / Organisation der Lehre

7.1 Attività didattiche / Formen von Lehrveranstaltungen

Sono previsti vari tipi di attività didattiche, che in modi diversi conferiscono conoscenze pratiche e teoriche:

Verschiedene Formen von Lehrveranstaltungen sind vorgesehen, welche auf unterschiedliche Art und Weise theoretische und praktische Kenntnisse vermitteln:

- *Corso*: insegnamento strutturato in regolari incontri con gli studenti e costituito da lezioni durante le quali il docente spiega il programma.
- *Vorlesung*: In Vorlesungen wird der Lehrstoff durch den Dozenten in regelmäßig abgehaltenen Vorträgen vermittelt.
- *Esercitazione*: attività che accompagna il corso ed è strutturata in regolari incontri con piccoli gruppi di studenti; durante l'esercitazione viene rielaborato il programma e/o lo studente applica le nozioni apprese durante la lezione; l'esercitazione può anche consistere nell'elaborazione di un progetto sotto la sistematica supervisione del docente.
- *Übung*: Übungen sind Veranstaltungen, welche begleitend zu Vorlesungen stattfinden und in denen die Durcharbeitung von Lehrstoffen sowie die Vermittlung von Fertigkeiten unter Mitarbeit des Studierenden in Kleingruppen erfolgt; die Übung kann auch in der Ausarbeitung eines Projektes unter der systematischen Anleitung eines Dozenten erfolgen.
- *Tirocinio formativo e di orientamento (Internship)*: attività esterna svolta presso strutture private o della pubblica amministrazione, il cui fine è quello di realizzare un momento di alternanza tra studio e lavoro e di agevolare le scelte professionali mediante la conoscenza diretta del mondo del lavoro. Il tirocinio è disciplinato dal "Regolamento di tirocinio generale d'Ateneo".
- *Ausbildungs- und Orientierungspraktikum (Internship)*: das Praktikum ist eine Tätigkeit außerhalb der Universität, welche in einem Unternehmen oder einer öffentlichen Verwaltung durchgeführt wird; gemäß den geltenden Normen ist es das Ziel eines Praktikums, einen Austausch von Lehre und Arbeit zu schaffen und die Berufswahl mittels direkter Erfahrungen in der Arbeitswelt zu erleichtern. Das Praktikum wird von der „Allgemeinen Praktikumsordnung der Universität“ geregelt.

- *Progetto (Project)*: attività durante la quale lo studente sviluppa autonomamente una ricerca scientifica sotto la supervisione di un docente e nel contesto delle attività della facoltà.
- *Progetto (Project)*: In einem Projekt löst der Studierende selbstständig eine wissenschaftliche Aufgabe unter Anleitung eines Dozenten in einem der Tätigkeitsbereiche der Fakultät.
- *Maker Lab*: attività durante la quale lo studente è coinvolto nella progettazione, nel disegno e nella produzione di manufatti/artefatti le cui funzioni sono implementate con l'ausilio di varie tecnologie informatiche e di comunicazione di basso livello (microprocessori, sensori, ecc.).
- *Maker Lab*: Im Maker Lab beschäftigt sich der Studierende mit der Planung, dem Design und der Produktion von Manufakten/Artefakten, deren Funktionen mit Hilfe verschiedener low-level Informations- und Kommunikationstechnologien (Mikroprozessoren, Sensoren, usw.) realisiert werden.

7.2 Quadro generale delle attività formative / Allgemeine Übersicht über die Lehrveranstaltungen

L'entità degli insegnamenti è stabilita come segue:

Der Umfang der Lehrveranstaltungen ist wie folgt festgelegt:

- 1 credito equivale a 8-10 ore di didattica in classe (incluse lezione frontale e esercitazione) e 15-17 ore di studio individuale; l'impegno orario complessivo riservato alle attività didattiche frontali è approvato dal Consiglio di Facoltà.
- 1 Kreditpunkt entspricht 8-10 Stunden Frontalunterricht (Vorlesung und Übung) und 15-17 Stunden individuellen Studiums; die Gesamtstundenzahl, der für den Frontalunterricht reserviert ist, wird vom Fakultätsrat genehmigt.
- *Tirocinio formativo e di orientamento*: 1 credito corrisponde a 25 ore di lavoro presso il luogo di svolgimento del tirocinio.
- *Ausbildungs- und Orientierungspraktikum*: 1 Kreditpunkt entspricht 25 Stunden Arbeitsleistung am Praktikumsort.
- *Progetto (Project)*: 1 credito corrisponde a 25 ore di lavoro autonomo dello studente presso la facoltà.
- *Projekt (Project)*: 1 Kreditpunkt entspricht 25 Stunden autonomer Tätigkeit des Studierenden an der Fakultät.

7.3 Lingua d'insegnamento / Unterrichtssprache

Gli insegnamenti sono tenuti nelle lingue inglese, italiano e tedesco. La lingua dei corsi è decisa annualmente dal Consiglio di Facoltà, tenendo conto sia della disponibilità dei docenti sia dell'equilibrio linguistico dell'offerta formativa.

Die Kurse werden in englischer, italienischer und deutscher Sprache abgehalten. Die Sprache der Kurse wird jährlich vom Fakultätsrat festgelegt, wobei sowohl die Verfügbarkeit von Dozenten als auch die sprachliche Ausgewogenheit des Angebots berücksichtigt wird.