

Module title		Abbreviation
Quantum Communications		10-I=QC-221-m01
Module coordinator		Module offered by
holder of the Chair of Computer Science VII		Institute of Computer Science
ECTS	Method of grading	Only after succ. compl. of module(s)
5	numerical grade	--
Duration	Module level	Other prerequisites
1 semester	graduate	--
Contents		
<ul style="list-style-type: none"> • Introduction • Hilbert Spaces and Operators • Quantum Mechanics • Quantum States • Quantum Circuit Elements • Entanglement and Its Applications • Quantum Key Distribution • Quantum Channel • Quantum Error Correction Coding • Continuous-Variable Quantum Communications • Further Topics 		
Intended learning outcomes		
<p>Students will</p> <ul style="list-style-type: none"> • develop a solid foundation in quantum information technology, including qubits, quantum gates, entanglement, and quantum measurements, • learn about secure communications using quantum mechanics, including protocols like Quantum Key Distribution (QKD), • gain familiarity with protocols such as quantum teleportation, superdense coding and error correction, and • understand the effects of noise and decoherence in quantum communications and learn strategies to mitigate their impact. 		
Courses (type, number of weekly contact hours, language — if other than German)		
V (2) + V (2) Module taught in: English		
Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)		
<p>written examination (approx. 60 to 120 minutes). If announced by the lecturer at the beginning of the course, the written examination may be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups of 2 candidates (approx. 15 minutes per candidate). Language of assessment: English creditable for bonus</p>		
Allocation of places		
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Additional information		
Focuses available for students of the Master's programme Informatik (Computer Science, 120 ECTS credits): LR		
Workload		
150 h		



Teaching cycle

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Module appears in

- Master's degree (1 major) Computer Science (2021)
- Master's degree (1 major) Computer Science (2023)
- Master's degree (1 major) Aerospace Computer Science (2023)
- Master's degree (1 major) Quantum Engineering (2024)
- Master's degree (1 major) Physics International (2024)
- Master's degree (1 major) Computational Mathematics (2024)
- Master's degree (1 major) Mathematics (2024)