Study plan - Quantum Engineering M.Sc.

updated 12.2025

Semester	Compulsory area	Compulsory elective area			Complementary area	CP
		Adaptation	**Quantum Physics**	**Electrical Engineering**		
1	Interdisciplinary aspects of quantum technologies. *Lecture: In first or second semesters.* **3 CP**	*Select adaptation modules from the catalogue opposite your undergraduate degree.*	*If you have a physics degree, start with the physics masters modules.*	*If you have an electrical engineering degree, start with the electrical engineering masters modules.*	*ASQ's , recommended first and second semesters*	60
2	Advanced Seminar Quantum Engineering **3 CP**	**12 CP**	*e.g. three modules, 6 CP each* **18 CP**	*e.g. three modules of 8 CP, 6 CP and 4 CP* **18 CP**	*e.g. two German classes* **6 CP**	
3	Research Project **15 CP**	**Mobility and subject-specific specialization:** Selected from lectures *and/or* Research Internships *or* Industrial Internships **15 CP**				30
4	**Master's Thesis** **30 CP**					30

Aim for approximately 30 CP each semester! CP=Credit Points, ASQ= Additive Transferable Skills Total: 120

If you have a degree in electrical engineering: you start with adaptation modules in physics, and with master modules in electrical engineering.

If you have a degree in physics: you start with adaptation modules in electrical engineering, and with master modules in physics.

Study Plan Quantum Engineering M.Sc.

17.02.2026

Structure											
Areas and Modules						min CP	type	SWS	semester	ben.	no. Exams
		module no.	exam no.	precourse no.							
A - Compulsory Area						**51**	**P**				
		75525	15525		Advanced Seminar Quantum Engineering	3	P	2S	SoSe	B	1
		75526	15526		Interdisciplinary aspects of quantum technologies	3	P	2V	SoSe	B	1
		75527	15527		Research Project	15	P	Pj	na	B	1
		80000	88888	88889	Master's Thesis	30	P	Pj	na	B	1
B - Compulsory Elective Area											
	B1	**Adaptation**				**12**					
		76031	16031	16531	Höhere Mathematik III – Differenzialgleichungen	5	W	3V+1Ü	WiSe	B	1
		72269	13319		Integrated Analog Circuits	6	W	3V+1Ü	SoSe (EN) WiSe (DE)	B	1
		72473	13598		Introduction to Microwave Engineering	5	W	3V+1Ü	SoSe	B	1
		75276	15276		Introduction to Quantum Engineering	4	W	2V	WiSe	B	1
		72382	13011		Mathematical Methods in Material Science	5	W	3V+1Ü	WiSe	B	1
		70366	10337	11619	Quantum Mechanics	8	W	4V+2Ü	SoSe	B	1
		70381	10419		Signale und Systeme	8	W	3V+2Ü+1S+1P	WiSe	B	1
	B2	**Quantum Physics**				**18**					
		76067	16067	16567	Condensed Matter Theory A: Quantum Mechanics on Macroscopic Scales	6	W	3V+2Ü	na	B	1
		76068	16068	16568	Condensed Matter Theory B: Quantum Transport and Topology	6	W	3V+2Ü	na	B	1
		76069	16069	16569	Condensed Matter Theory C: Phase Transitions in Condensed Matter Systems	6	W	3V+2Ü	na	B	1
		77159	17159	17359	Classical & Quantum Non Linear Dynamics	6	W		SoSe	B	1
		72190	13078	13079	Experimental Quantum Optics	6	W	3V+2Ü	SoSe	B	1
		77108	17108	17308	Introduction to Nuclear Magnetic Resoncance	6	W	3V+2Ü	WiSe	B	1
		74198	14198		Introduction to Quantum Electronics	3	W	3V+2Ü	SoSe	B	1
		77079	17079	17579	Matter Wave Optics	6	W	3V+2Ü	WiSe	B	1
		75168	15168		Quantum Machine Learning	4	W	2V+1S	SoSe	B	1
		71766	12580	12581	Open Quantum Systems	6	W	3V+2Ü	WiSe	B	1
		77081	17081	17581	Quantum Computing	6	W	3V+2Ü	SoSe	B	1
		71820	11397		Quantum Computing (Computer Science)	6	W	3V+1Ü	WiSe	B	1
		75481	15481		Quantum Sensing I	4	W	2V	WiSe	B	1
		75482	15482		Quantum Sensing II	4	W	2V	SoSe	B	1
		77110	17110	17310	Quantum theory of macroscopic mechanical systems	6	W	2V+2Ü	SoSe	B	1
		75068	15068		Seminar Quantum Sensing and Metrology	3	W	2S	na	B	1
		75024	15024		Seminar Ultracold Quantum Gases	3	W	2S	WiSe	B	1
		71420	11959	11975	Theoretical Quantum Optics	6	W	3V+2Ü	SoSe	B	1
		71500	11665	12118	Theory of Quantum Information	6	W	3V+2Ü	SoSe	B	1
		71504	12104	12114	Ultracold Quantum Gases	6	W	3V+2Ü	SoSe	B	1
	B3	**Electrical Engineering**				**18**					
		70451	10489		Advanced Optoelectronic Communication Systems	6	W	3V+1Ü	WiSe	B	1
		75278	15278		Advanced Quantum Engineering	4	W	2V	SoSe	B	1
		75139	15139		Active Optoelectronic Devices	6	W	3V+1Ü	SoSe	B	1
		75687	15687		Einführung in die Mikro- und Nanotechnologien	5	W	2V+1Ü+1P	SoSe	B	1
		75805	15805		Fourier Optics and Holography	5	W	2V+2Ü	SoSe	B	1
		75640	15640		Information Theory	6	W	2V+2Ü	WiSe	B	1
		75196	15196		Integrated Broadband Circuits	6	W	3V+1Ü	WiSe	B	1
		75166	15166		Integrated High-Frequency Circuits	6	W	3V+1Ü	SoSe	B	1
		72274	13326	13327	Integrated Interface Circuits	6	W	3V+1Ü	SoSe	B	1
		75197	15197		Microwave System Design	6	W	3V+1Ü	WiSe	B	1
		71723	12486		Optical Communications	6	W	3V+1Ü	SoSe	B	1
		75481	15481		Quantum Sensing I	4	W	2V	WiSe	B	1
		75482	15482		Quantum Sensing II	4	W	2V	SoSe	B	1
	B4	**Mobility and Subject-Specific Specialisation**				**15**					
		Modules to complement the curriculum and/or									
		75542	15542		Research Internship I	10	W		na	U	1
		75634	15634		Research Internship II	15	W		na	U	1
		75540	15540		Industrial Internship I	10	W		na	U	1
		75541	15541		Industrial Internship II	15	W		na	U	1
		75652	15652		Advanced Physics Lab II	6	W		WiSe	U	1
		77131	17131	17331	Advanced Quantum Mechanics (Fortgeschrittene Quantenmechanik)	6	W		WiSe	U	1
		74147	14147		Big Data Analytics - Methods and Applications	7	W	3V+1Ü	SoSe	B	1
		71994	11301		Data Mining	6	W	3V+1Ü	SoSe	B	1
		75467	15467		Gründergarage I - Businessplan	6	W		Wise	B	1
		75468	15468		Gründergarage II - Accelerator	6	W		SoSe	B	1
		71737	12499		Laboratory Vector Network Analysis	5	W	3P	WiSeSoSe	U	1
		75096	15096		Project High-Frequency Amplifier Design	6	W	4P	WiSeSoSe	U	1
		75261	15261		Project High-Frequency Integrated Circuit Design	6	W	4P	WiSeSoSe	U	1
		75660	15660		Project RF Engineering	5	W	3P	WiSeSoSe	U	1
		75234	15234		Successful Project Management - Fundamentals	4	W	2V+1Ü	WiSe	B	1
C - Complementary Area						**6**					
		86100			Additive Key Qualification I	3	E	2S		B	1
		86200			Additive Key Qualification II	3	E	2S		B	1
		86300			Additive Key Qualification III	3	E	2S		B	1
						120					

type: P = Pflicht, compulsory; W = Wahlpflicht, elective; E = Ergänzung, complementary

ben: B = benotet, graded; U = unbenotet, ungraded

SWS: Semesterwochenstunde, classroom hours; V = Vorlesung, lecture, U = Ubung, exercise, P = Praktikum, lab, Pj = Projekt, project, S = Seminar, T = Tutorium

LP: Leistungspunkte, credit points