Module: Atomic Structure and Chemical Bonding

University/Department/Institute: Freie Universität Berlin/Department of Biology, Chemistry, Pharmacy/Institute of Chemistry and Biochemistry

Module supervisors: Lecturers of the module

Entrance Requirements: none

Goals of Qualification: Students have acquired a basic understanding of quantum theory and its application to simple examples of chemical relevance. They are able to describe the electronic structure of atoms and small molecules and know atomic models and the quantum mechanical basis of spectroscopic measurements. They are able to work independently and in groups to solve simple assignments concerning the quantum nature of chemical model systems.

Contents: Introduction to the quantum nature of matter and energy, basics of quantum theory, quantum mechanical solutions to the time - dependent Schrödinger - equation for chemically relevant model systems, Multi-electron atoms, quantum theory of orbital angular momentum and of the spin, quantum mechanics of the hydrogen atom, Spin - orbit coupling, theory of the chemical bond, elemental quantum theory of simple molecules

Teaching methods	**Hours of attendance** (Hours per week)	**Forms of active participation**	**Workload** (hours)	
Lectures	4	-	Presence (L) Pre-, post-preparation (L) Presence (T) Pre- , post-preparation (T) Exam preparation and examination	60 60 30 30 60
Tutorials	2	Solving assignments, Contributions to topic related discussions		

Language offer of lecture	German	
Compulsory regular attendance	Attendance is recommended	
Workload (total)	240 hours	8 CP
Length of module	Two semesters	
Examination	Exam (180 minutes); The exam can also be conducted electronically	
Lecture is offered	Every semester	
Applicability	Bachelor study program Chemistry	