Module: Basic Lab Training in Physical Chemistry

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

Module supervisors: Lecturers of the module

Entrance Requirements: successful completion of the module „Basics of Mathematics for Chemistry" and "Basics of Physics for Chemists and Biochemists"

Goals of Qualification: Students have acquired the basic knowledge of the theory of point groups and the discussion of arguments of symmetry in chemistry and are able to apply it to different contexts. They are able to competently describe and explain measurements setups for the characterization of physical – chemical processes in oral or written form. Experimental results can be depicted in graphs according to the current scientific standards. The acquisition of data in the field of physical – chemistry is based on the application of a conceptual and theory led understanding of the experiment. The quality of the acquired data sets in the field of physical chemistry complies with good scientific practice and self – critical examination of possible experimental inaccuracies. Students are able to work in a team, distribute assignments evenly and are aware of the laboratory related hazards when dealing with laboratory equipment and hazardous substances.

Contents: Application of elemental methods of the group theory on assignments of the field of chemical bonds and spectroscopy, application of the knowledge in the field of chemical thermodynamics for the experimental characterization of physic-chemical processes, especially chemical reactions and phase transitions, utilization of statistical methods for the critical estimation of experimental inaccuracies, application of suitable computer – software for the numeric analysis and graphic depiction of data sets.

Teaching methods	**Hours of attendance** (Hours per week)	**Forms of active participation**	**Workload** (hours)	
Lecture	1	Exam	Presence (L)	15
			Pre-, post-preparation (L)	15
Tutorial	1	Solving assignments, Contributions to topic related discussions,	Presence (T)	15
			Pre- , post-preparation (T)	15
			Presence (Lab)	
			supervised lab training	15
Lab Training	1	research on theoretical background, preparation and conduction of experiment (6-8 experiments)	*self-study in lab*	15
			Pre-, post-preparation (Lab)	30
			Exam preparation and examination	30
Language offer of lecture		German, if required by circumstances: English		
Compulsory regular attendance		Lecture and tutorial attendance is recommended, Lab training: yes		
Workload (total)		150 hours		5 CP
Length of module		One semester		
Examination		Practical examination (Presentation of theoretical background, experimental results and protocols)		
Lecture is offered		Every semester		
Applicability		Bachelor study program Chemistry		