Module: Advanced Chemistry Lab Course for Teaching Training Students

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 passing of the modules „General and Inorganic Chemistry", "Basic Chemistry Lab Course for Teaching Training Students", „Basics of Organic Chemistry", "Basics of Physical Chemistry" and of the module „ Basic Mathematics for students of Chemistry"

Goals of qualification: Students are able to set up and safely use simple lab apparatus for the conversion of organic-chemical materials, and are able to determine thermodynamic, electrochemical and reaction kinetics data by physico-chemical measurements and relate this to a high school level education. They are aware of lab related risks when dealing with lab equipment and hazardous materials and have obtained sufficient knowledge about the standard precautionary measurements. They are aware of the specific hazards for pregnant and breast-feeding women. They are able to use available resources as a team or will work in smaller groups. They can research the theoretical background of an experiment independently and present experiment and background in oral and written form. They can identify compounds with the use of simple spectroscopic data.

Contents: School relevant chemical experiments for the characterization and conversion of compounds by the use of simple measuring techniques and lab methods for the conversion of compounds as well as for the physico-chemical characterization of chemical processes; application of software to analyze measured data sets and spectroscopic methods for structure determination of synthesized compounds; usage of statistical methods for the objective assessment of experimental inaccuracy.

Teaching methods	**Hours of attendance** (semester periods per week)	**Forms of active participation**	**Work effort (hours)**
Lecture	2	Test on spectroscopy	Presence (L) 30 Pre- , post-preparation (L) 30 Presence (Lab) *supervised lab training* 120 *self-study in lab* 50 Pre- and post-preparation (Lab) 40 Exam preparation and examination 30
Safety relevant lab training	8	Test on lab safety, Research on theoretical background , preparation and conduction of experiment (12-16 experiments)	
Language spoken in lecture		German, English if necessary	
Compulsory regular attendance		Lecture: attendance is recommended, lab training: yes	
Work effort (total)		300 hours	10 CP
Length of module		One semester	
Examination		Practical examination (presentation of theoretical background, experimental results and protocol)	
Lecture is offered		Every semester	
Applicability		Bachelor study program Chemistry for Teaching Training Students, 60-CP-Module offer Chemistry	