8. Topic area Environmental Chemistry

Module: Environmental Chemistry: Energy and Special Atmospheric Chemistry	
University/department/institute: Freie Universität Berlin/Department of Biology, Chemistry and Pharmacy/Institute of Chemistry and Biochemistry	
Responsible for the module: module lecturers	
Admission requirements: none	
Qualification aims: The students are familiar with important cross-disciplinary principles of environmental chemistry in relation to energy and energy conversion; they have deepened their knowledge of atmospheric chemistry. They are familiar with the principle interactions of the physical-chemical processes of energy conversion and of the atmosphere. They are capable of classifying and evaluating the impact of humans on the environment in detail, and are thus able to analyze complex interactions in the environment, to understand original publications on environmental research on a broad basis and to carry out independent scientific research in the environmental field. They have a good foundation of knowledge as a basis for a professional career in environmental protection.	
Content: Energy and energy conversion; energy stocks; periodically working machines with practical examples; energy storage; fossil energy sources; production of liquid and gaseous energy sources; use of fossil energy sources including technical applications (power stations; combined heat and power generation); renewable energy sources (photovoltaics, photothermal energy collection, solar power stations, wind power, hydro power (tides, waves); geothermal sources; biogenic energy sources (biogas, biosludge, waste incineration); atomic fission and fusion; properties of moist air; humidity measurements; atmospheric instability; aerosols and precipitation; nucleation; clouds and cloud chemistry; aerosols and clouds in the stratosphere; special topics in atmospheric chemistry (chemistry of photooxidants, hydrochlorofluorocarbons and their replacements, chemistry of the stratosphere and upper atmosphere, chemistry of planetary atmospheres, spread and degradation of persistent organic pollutants, indoor emissions); special environmental measuring processes (remote sensing and in-situ measuring processes); chemical models to simulate environmental changes	

Teaching and learning units	**Attendance** (Semester hours per week = SH)	**Forms of active participation**	**Study time** (hours)	
Lecture I	2	-	Attendance L I Preparation and follow-up L I Attendance L II Preparation and follow-up L II Examination preparation, examination	30 30 30 30 30
Lecture II	2	-		

Language of instruction	German	
Compulsory regular attendance	Attendance recommended	
Study time, total hours	150 hours	5 CP
Duration of module	Two semesters	
Module offered	Every semester	
Application	Master's program in Chemistry	