3. Topic area Biochemistry: see information in Section 4 paragraph 9 and on the first page of the module information

4. Topic area Macromolecular Chemistry

Module: Advanced Macromolecular 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: Introduction to Macromolecular Chemistry	
Qualification aims: The students have deepened their understanding of macromolecular chemistry. They know the fundamental principles and specific mechanisms of polymerization reactions; the influence on structure and properties of the resulting polymers and can discuss the application areas and limitations which result. They know modern methods and processes for preparing different polymers on a laboratory scale and an industrial scale. They are familiar with examples of current research areas of polymer chemistry and examples of applications of functional polymer materials. They can carry out independent literature research on special areas of polymer chemistry and can present the findings accurately and appropriately to a group.	
Content: Anionic polymerization (living polymerization, polyether, polyolefins, polyacrylate, copolymers), cationic polymerization (polyether, polyolefins), radical and controlled radical polymerization (emulsion polymerization, suspension polymerization, kinetics, ATRP, RAFT, NMP); metal mediated polymerization (polyolefin, *Aufbaureaktion*, Ziegler-Natta polymerization, metallocene catalysts, late transition metal catalysts, metathesis polymerization); polycondenzation (polyester, polyamide, polycarbonate, polyurethane) with elementary steps in each case; kinetics; influence on the polymer structure; properties, applications and examples; special application fields (biomaterials, electronics, organic synthesis, ion exchangers); industrial polymer chemistry	

Teaching and learning units	**Attendance** (Semester hours per week = SH)	**Forms of active participation**	**Study time** (hours)	
Lecture	40 hours	-	Attendance L Preparation and follow-up L Attendance S Preparation and follow-up S Examination preparation, examination	40 20 20 40 30
Seminar	20 hours	Contributions to discussion, seminar lecture		

Language of instruction	English	
Compulsory regular attendance	Lecture: attendance recommended; seminar: yes	
Study time, total hours	150 hours	5 CP
Duration of module	Block course in the first half of the lecture phase	
Module offered	Every winter semester	
Application	Master‘s program in Chemistry; Master’s program in Polymer Science	