[E1.1]	Advanced Biophysical Methods	Compulsory elective module	5 CP (total) = 150 h		4 SWS
			Contact hours 4 SWS / 60 h	Independent study 90 h	

Content

Seminar: In the seminar, advanced biophysical methods and concepts needed to explain the interaction of structure, function and dynamics of biological macromolecules (e.g. quantum chemical fundamentals of spectroscopy, advanced EPR spectroscopy (pulsed method), advanced L-NMR spectroscopy (dynamics, structure calculation), advanced solid state NMR spectroscopy (techniques for structure determination), scattering and diffraction methods: SAND, SAXS) are thematised through the discussion of concrete application examples. Presentations to be given by the students, which either deepen topics from the lecture or present current application examples from the literature, play a central role here.

Practical course: Solid state NMR is an important method for studying insoluble proteins (fibrils, membrane proteins). In this experiment, the students learn the most important features of MASNMR and learn to understand anisotropic interactions. You will measure precise core-core distances via dipole-dipole coupling and compare these data with those from crystallography and solution NMR. The data is evaluated using simulations, so that general knowledge about the interplay between theoretical predictions and experimental verification is also imparted.

Learning outcomes and skills

After successful completion, students:

- are able to analyze and interpret results and to verify measurement data on the basis of the learned methods of data acquisition.
- are able to apply the methods to concrete tasks and to calculate with measurement data.
- have developed a feeling for actual measurements.
- are able to critically assess the applicability of the above methods for specific questions
- are able to work out special topics and application examples with the background knowledge acquired and to present them to a specialist audience
- are able to critically evaluate and discuss original literature on this topic (in English)

Admissions requirements/Conditions for participation in the module/courses

Recommended prior knowledge

Methods for Structural Biology and Biophysics module

Organizational details

Module allocation (degree programme/faculty)	Master Biochemistry / FB14
Module transferrable to other degree programmes	
Module offered	summer semester
Duration	1 semester
Module coordinator	Prof. Dötsch
Course requirements for credits	
Participation record	
Coursework	Practical course: Conducting experiments and writing a protocol Expert discussion (30 min.)
Forms of teaching / learning	Seminar, practical course
Language teaching and instruction	English
Module assessment	**Form / duration / content, if applicable**
Final module assessment	None
Cumulative module assessment consisting of	
Composition of the module grade for cumulative module assessment	

	Mode of teaching / study	Semester hours per week	Semester CP			
			1	2	3	4
Advanced biophysical methods	S	2		3		
Advanced biophysical methods	P	2		2		
TOTAL		4		5		