

MNF-chem1003	Physical Chemistry 4: Molecular Spectroscopy		
Semester / Duration	Annually: Winter Semester Duration: 1 Semester		
Responsible Professor	Prof. Dr. Friedrich Temps Fon 0431-880-1703, Email: temps@phc.uni-kiel.de		
Course(s) of Studies	M.Sc. Chemistry: 1. Semester	Compulsory	
	M.Sc. Business Chemistry: 1. – 2. Semester	Compulsory	
Advice for the Module	Prof. Dr. Friedrich Temps		
Classes	Name of Class / Lecturer	SWS	Status
	Lecture on Molecular Spectroscopy Prof. Dr. F. Temps	2 SWS	Compulsory
	Excercise Class on Molecular Spectroscopy Prof. Dr. F. Temps	1 SWS	Compulsory
Number of Places	Lecture: 30; Exercise Class: 30		
Language	English		
Work Load	Contact Hours: 42 h		
	Self Study: 108 h		
Credit Points	5		
Conditions	B.Sc. in Chemistry, Business Chemistry, Biochemistry and Molecular Biology or Physics		
desired knowledge			
Goals	The students learn to apply their fundamental knowledge of spectroscopy from the B.Sc. study course to real (polyatomic) molecules. They learn to analyze and interpret spectra of molecules in different spectral regimes.		
Contents	<ul style="list-style-type: none"> • Common experimental methods and devices in spectroscopy; • Interactions of electromagnetic radiation with matter; • Solution of the time-dependent Schrödinger equation; • Transition dipole moment and intensities of spectroscopic transitions; • Selection rules; • Introduction to molecular symmetry and group theory; • Coherent processes, Rabi frequency; • Line widths and line broadening mechanisms; • Rotational spectra of polyatomic molecules; • Vibrational spectra of polyatomic molecules; • Electronic spectra of diatomic and polyatomic molecules. 		
Key Qualifications	<ul style="list-style-type: none"> • Structured and analytical thinking; • Application of models to real chemical problems. 		
Exam(s)	Exams: <ul style="list-style-type: none"> • Solution of homework assignments (Ü), • Short questions (T, 10 min every 2 weeks), • Written exam at end of lecture period (K). 		
	Module grade: <ul style="list-style-type: none"> • The module marks are calculated according to the following formula: $P = 0,3 \times (\% \ddot{U}) + 0,3 \times (\% T) + 0,4 \times (\% K) \geq 60\%$ or 		

	<p style="text-align: center;">$P \geq 0,60 \times (\%K)$</p> <p>whichever is better.</p> <ul style="list-style-type: none"> • The minimum number of points to pass is 60%.
	<p>Scheduled time for written exam: End of lecture period, 1st repetition: Before start of lecture period of the following semester, 2nd repetition: After lecture period of the following semester.</p>
	<p>Exam language: German</p>
	<p>Relevance for final M.Sc. marks:</p> <ul style="list-style-type: none"> • Module mark enters weighted with the number of credit points.
Literature	<ul style="list-style-type: none"> • P. F. Bernath, Spectra of Atoms and Molecules, Oxford University Press • P. W. Atkins, R. S. Friedman, Molecular Quantum Mechanics, Oxford University Press; • J. M. Hollas, Moderne Methoden in der Spektroskopie, Vieweg; • Lecture Scriptum
Further Remarks	