



Stockholm  
University

Institutionen för biokemi och biofysik

## Schedule for Biomolecular NMR, 15hp, HT 2016

### Lecturers:

Jens Danielsson	<i>jens.danielsson@dbb.su.se</i>	tel. 16 24 59
Jozef Kowalewski	<i>jk@mmk.su.se</i>	tel. 16 23 76
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### Practicals and calculations:

*Sarah Leeb and Biao Fu*

**Place:** K441

Vecka	Time	Monday	Tuesday	Wednesday	Thursday	Friday
35 (29/8-2/10)	9:15 13:00	Intro (JD)	L1 (JK)	L2 (JK)	L3 (JK)	L4 (JK) Calc. 1
36 (5/9-9/9)	9:15 13:00	L5 (JK)	L6 (JK)		13:00 Basic NMR	L7 (JK) Calc. 2
37 (12/9-16/9)	9:15 13:00	L8 (JK)	L9 (JK) Calc. 3	L10 (JK)	13:00 INEPT	
38 (19/9-23/9)	9:15 13:00	L11 (LM)	L12 (LM) Calc. 4	L13 (LM)		
39 (26/9-30/9)	9:15 13:00	L14 (LM)	L15 (JD)	L16 (JD) Calc 5	L17 (JD)	13:00 Relax
40 (3/10-7/10)	9:15 13:00	13:00 Diffusion		L18 (JD)	L19 (JD)	13:00 Triple resonance
41 (10/10-14/10)	9:15 13:00	L20 (JD)	L21 (JD) Calc. 6	L22 (JD)	13:00 H/D exchange	
42 (17/10-21/10)	9:15 13:00	L23 (AG)	Recap			
43 (24/10-28/10)	9:15 13:00	Literature pres.		Recap		Exam 9.00-14.00

### Literature:

J. Keeler, Understanding NMR Spectroscopy, 1:st edition, 2006, or 2<sup>nd</sup> ed 2010.

Handouts

### Practical information

- 1) Practical labs is preceded by a short test, replacing reports
- 2) Lectures are normally between 9.15 and 12.00
- 3) The practicals start at 13:00.

4) Literature projects are presented orally on 19/10

**Practicals:**

<b>Basic NMR</b>	<b>Basic Ft NMR</b>
<b>INEPT</b>	<b>Polarization transfer through INEPT and HSQC</b>
<b>Relax</b>	<b>Relaxation and dynamics</b>
<b>Tripple reson.</b>	<b>Protein structure by NMR</b>
<b>Diffusion</b>	<b>PFG-Diffusion</b>
<b>H/D exchange</b>	<b>Hydrogen-deuterium exchange</b>

**Contents of lectures**

Lecture	Contents	Chapter in Keeler's book
L1	Basics	1-2
L2	Energy levels and spectra	3
L3	The vector model	4
L4	Fourier transformation	5
L5-L6	Quantum mechanics of one spin	6
L7-L8	Product operators	7
L9-L10	Two-dimensional NMR	8
L11-L13	Relaxation and motion	9+handouts
L14	NOESY and chemical exchange	9
L15	Intro Bio-molecular NMR	handouts
L16	Multidimensional NMR	handouts
L17-L19	Structure and dynamics of proteins	handouts
L20	Interactions and binding	handouts
L21-L22	Time-optimizing and applications thereof	handouts
L23	Introduction to EPR	
L24	Extra time	