

Time / Date	7:00 – 8:30	Lecture Session I 8:30 – 10:00	Exercise Session I 10:30 – 12:00	12:30 – 14:00	Lecture Session II 14:00 – 15:30	Exercise Session II 16:00 – 17:30	17:30 – 19:00	19:00 – ...	
6 Sep	ARRIVAL DAY 1						Free Time	Dinner *	
7 Sep	Break-fas	Mathematical Foundation 1 <b>Kim Lefmann, Jakob Lass</b>	Mathematical Foundation 2 <b>Kim Lefmann, Jakob Lass</b>	Lunch	Mathematical Foundation 3 <b>Kim Lefmann, Jakob Lass</b>	Mathematical Foundation 4 <b>Kim Lefmann, Jakob Lass</b>	Free Time	Dinner *	
8 Sep	Break-fas	Mathematical Foundation 5 <b>Kim Lefmann, Jakob Lass</b>	Mathematical Foundation 6 <b>Kim Lefmann, Jakob Lass</b>	Lunch	Solid State Physics Foundation <b>Kim Lefmann, Jakob Lass</b>	Magnetism Foundation <b>Kim Lefmann, Jakob Lass</b>	WELCOME RECEPTION		
ARRIVAL DAY 2									
9 Sep	Break-fast	<b>Welcome to the School</b> <ul style="list-style-type: none"> <li>Practicals, Examination Process</li> <li>How to write a proposal (45 min)</li> <li>Safety at large-scale facilities</li> </ul> <b>Kim Lefmann, University of Copenhagen</b> <b>Martin Månsson, KTH</b>	<b>L0: Overview of the course</b> <ul style="list-style-type: none"> <li>The Neutron/scattering experiment</li> <li>Production / "Filters / Detection</li> <li>Elastic/Inelastic</li> <li>Brief overview of the techniques</li> </ul> <b>Martin Månsson, KTH</b>	Lunch	<b>L1: Intro</b> <ul style="list-style-type: none"> <li>Basic interaction mechanism (+x-rays)</li> <li>Scattering from 1 &amp; 2 nuclei</li> <li>Coherent / Incoherent / Absorption</li> </ul> <b>Kim Lefmann, University of Copenhagen</b>	Ex. 1 <ul style="list-style-type: none"> <li>Scattering from 1 &amp; 2 Nuclei</li> <li>Coherent / Incoherent</li> </ul>	Free Time	Dinner *	
10 Sep	Break-fast	<b>L2: Neutron Sources &amp; Instrumentation</b> <ul style="list-style-type: none"> <li>Sources Moderators</li> <li>Monochromators / choppers</li> <li>Collimation / Filters / Guides</li> <li>Detection</li> </ul> <b>Kim Lefmann, University of Copenhagen</b>	Ex. 2 <ul style="list-style-type: none"> <li>Build your virtual neutron instrument</li> </ul> (e-learning)	Lunch	<b>L3: Neutron Interaction with Matter</b> <ul style="list-style-type: none"> <li>Cross Section, Isotope Sensitivity</li> <li>Elastic / Inelastic</li> <li>X-rays/electrons</li> <li>Multiple Scattering</li> </ul> <b>Kim Lefmann, University of Copenhagen</b>	Ex. 3 <ul style="list-style-type: none"> <li>Cross Section</li> <li>Selection of materials<sup>e</sup></li> </ul> (e-learning)	Free Time	Dinner *	
11 Sep	Break-fast	<b>L4: Magnetic Scattering</b> <ul style="list-style-type: none"> <li>Magnetism</li> <li>Nuclear/Magnetic Scattering</li> </ul> <b>Kim Lefmann, University of Copenhagen</b>	Ex. 4 <ul style="list-style-type: none"> <li>Spin Structure</li> </ul> (new e-learning)	Lunch	<b>L5: Crystallography</b> <ul style="list-style-type: none"> <li>Crystallography</li> <li>k-space</li> <li>Brillouin Zone</li> </ul> <b>Nami Matsubara, KTH</b>	Ex. 5 <ul style="list-style-type: none"> <li>(e-learning)</li> </ul>	Free Time	Dinner *	
12 Sep	Break-fast	<b>L6: Diffraction I</b> <ul style="list-style-type: none"> <li>Instrumentation</li> <li>Powder</li> <li>Neutron / x-rays</li> </ul> <b>Nami Matsubara, KTH</b>	Ex. 6 <ul style="list-style-type: none"> <li>Refinement</li> </ul> <b>Nami Matsubara, KTH</b>	Lunch	<b>L7: Diffraction II</b> <ul style="list-style-type: none"> <li>Laue, Single-crystal</li> <li>Total Scattering</li> <li>Nuclear / Magnetic</li> </ul> <b>Nami Matsubara, KTH</b>	Ex. 7 Refinement (cont.) <b>Nami Matsubara, KTH</b>	Free Time	Dinner *	
13 Sep	Break-fast	FREE DAY / EXCURSION							Dinner *
14 Sep	Break-fast	<b>L8: Reflectometry I</b> <ul style="list-style-type: none"> <li>Instrumentation</li> <li>Specular/off-specular</li> <li>Optical Matrix</li> <li>Kinematic Approximation</li> <li>Applications</li> </ul> <b>Adrian Rennie, Uppsala University</b>	Ex. 8 <ul style="list-style-type: none"> <li>Virtual reflectometry</li> <li>Optical matrix fits</li> </ul> (e-learning)	Lunch	<b>L9: Reflectometry II + GiSANS</b> <ul style="list-style-type: none"> <li>Distorted Born approximation</li> <li>GiSANS Instrumentation</li> <li>In plane / out of plane</li> <li>Applications</li> </ul> <b>Adrian Rennie, Uppsala University</b>	Ex. 9 <ul style="list-style-type: none"> <li>Biomembranes</li> <li>Contrast Variations</li> <li><b>Magnetism</b></li> </ul>	Free Time	GALA DINNER	

15 Sep	Break-fast	<b>L10: Neutron Imaging</b> <ul style="list-style-type: none"> <li>Instrumentation</li> <li>Radiography / Tomography</li> <li>In operando</li> <li>Neutrons / x-rays</li> </ul> <b>Luise Theil Kuhn, DTU</b>	Ex. 10 <ul style="list-style-type: none"> <li>Virtual Imaging Experiment</li> </ul> (e-learning)	Lunch	<b>L11: SANS I</b> <ul style="list-style-type: none"> <li>Instrumentation2</li> <li>Scattering Length Density</li> <li>Form-/Structure Factor</li> <li>Approximations</li> </ul> <b>Andrew Jackson, Lund University / ESS</b>	Ex. 11 "Experiment" <ul style="list-style-type: none"> <li>Virtual SANS experiment</li> <li>Resolution (wavelength vs. angle)</li> <li>Data Treatment</li> <li>(e-learning)</li> </ul>	Free Time	Dinner *		
16 Sep	Break-fast	<b>L12: SANS II</b> <ul style="list-style-type: none"> <li>Geometrical models</li> <li>Contrast Variations</li> <li>Time-resolved / stroboscopic</li> <li>Applications</li> </ul> <b>Andrew Jackson, Lund University / ESS</b>	Ex. 12 "Data Modeling" <ul style="list-style-type: none"> <li>Spheres vs. cylinders</li> <li>Polydispersity</li> <li>Resolution</li> <li>+ <b>Magnetism !!!</b></li> </ul>	Lunch	<b>L13: INS I "Intro"</b> <ul style="list-style-type: none"> <li>Instrumentations (TAS/ToF)</li> <li>Direct / Indirect geometry</li> <li>Pulsed/Continuous</li> <li>E/p conservation</li> <li>k-space (reminder)</li> <li>Examples (nuclear / magnetic)</li> </ul> <b>Kim Lefmann, University of Copenhagen</b>	Ex. 13 <ul style="list-style-type: none"> <li>Virtual INS experiment</li> </ul> (e-learning)	Free Time	Dinner *		
17 Sep	Break-fast	<b>L14: INS II "Nuclear"</b> <ul style="list-style-type: none"> <li>Phonons (basics)</li> <li><math>\omega/\tau</math> domain</li> <li>Cross sections</li> <li>Applications</li> </ul> <b>Gediminas Simutis, Paul Scherrer Institute</b>	<b>L15: INS III "Magnetic"</b> <ul style="list-style-type: none"> <li>Spin waves</li> <li>Magnetic Cross Section</li> <li>Applications</li> </ul> <b>Kim Lefmann, University of Copenhagen</b>	Lunch	Ex. 14 <ul style="list-style-type: none"> <li>Modelling phonons/spin waves</li> <li>Extract J's</li> <li>Spin-W</li> </ul> <b>Simon Ward, ESS / DMSC</b> <b>Johan Hellsvik, NORDITA</b>	Ex. 14 (continued) <ul style="list-style-type: none"> <li>Modelling phonons/spin waves</li> <li>Extract J's</li> <li>Spin-W</li> </ul> <b>Simon Ward, ESS / DMSC</b> <b>Johan Hellsvik, NORDITA</b>	Free Time	Dinner *		
18 Sep	Break-fast	<b>L16: Polarized Neutron Scattering: BASICS</b> <ul style="list-style-type: none"> <li>Polarizing/Flipping/Detecting the neutron spin (theory &amp; technologies)</li> <li>Basic theory</li> <li>Examples (Elastic &amp; Inelastic)</li> </ul> <b>Werner Schweika, ESS</b>	<b>L17: QENS</b> <ul style="list-style-type: none"> <li>Instrumentation</li> <li>Energy/time-scales</li> <li>Coherent / Incoherent</li> <li>Diffusion, Molecular dynamics</li> <li>Cross section &amp; Isotope labeling</li> </ul> <b>Mark Telling, STFC/ISIS</b>	Lunch	Ex. 15 <ul style="list-style-type: none"> <li>Polymer Dynamics (dynamics / diffusion)</li> <li>Isotope labeling</li> </ul> <b>Mark Telling, STFC/ISIS</b>	Ex. 15 (continued) <ul style="list-style-type: none"> <li>Polymer Dynamics (dynamics / diffusion)</li> <li>Isotope labeling</li> </ul> <b>Mark Telling, STFC/ISIS</b>	Free Time	Dinner *		
19 Sep	Break-fast	<b>L18: Keynote Lecture: "Challenge 1"</b> <b>Neutrons for Life</b> <b>Luke Clifton</b> <b>STFC / ISIS</b> <b>UK</b>	<b>L19: Keynote Lecture: "Challenge 2"</b> <b>Neutrons for Skyrmions</b> <b>Henrik Rønnow</b> <b>EPF Lausanne</b> <b>Switzerland</b>	Lunch	<b>L20-21: Keynote Lecture: "Challenge 3"</b> <b>Neutrons + Muons + X-rays for Sustainability (energy)</b> <b>Martin Månsson</b> <b>KTH Royal Institute of Technology</b> <b>Sweden</b>		Free Time	End Dinner		
20 Sep	Break-fast	<b>Help for Proposal Writing</b> <ul style="list-style-type: none"> <li>Proposal Writing "Workshop"</li> <li>Teachers + NNSP/SwedNess admin will be available</li> </ul>	<b>L22: Key-Note Lecture: "ESS"</b> <b>Future Science at ESS</b> <b>Andreas Schreyer, ESS</b>	Lunch	<b>Help for Proposal Writing</b> <i>(continued)</i>			Dinner *		
21 Sep	Break-fast	<b>DEPARTURE DAY</b>								

\* Dinners during the normal lecture days are your own responsibility. SwedNess/NNSP are only organizing the "Welcome Reception", "Gala Dinner" and "End Dinner". Lunch is included.