

Probing Nanoscale Structures
Fall 2011

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Week 1: 9/04 to 9/11 First Week

Week 2: 9/11 to 9/18

Week 3: 9/18 to 9/25

Week 4: 9/25 to 10/02

Week 5: 10/02 to 10/09

Week 6: 10/09 to 10/16

Week 7: 10/16 to 10/23

Week 8: 10/23 to 10/30

Week 9: 10/30 to 11/06

Midterm Exam: Thursday November 3rd

Week 10: 11/06 to 11/13

Week 11: 11/13 to 11/20

Week 12: 11/20 to 11/27

Week 13: 11/27 to 12/04

Week 14: 12/04 to 12/11

Week 15: 12/11 to 12/18 Last Week

Final Exam: Thursday December 15th

Week 1

	Course Setup		
	Outline – the SANS Toolbox		No Homework

Week 2

	Chapter 1 - Introduction	Chapter 2 – the Neutron Probe	Chapter 3 – Neutron Sources
	Chapter 4 – Cold Neutron Moderators	Chapter 5 – Neutron Flux on Sample	Homework

Week 3

	Chapter 10 – The SANS Technique	Chapter 11 – The SANS Instrument	Chapter 12 – Velocity Select. and TOF Measurements - Deriv
	Chapter 13 – Neutron Area	Chapter 14 – Sample	Homework

	Detectors	Environments	
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Week 4

	Chapter 22 – Standard Plots	Chapter 23 – Empirical Models - Deriv	Chapter 24 – Representative SANS Data
	Chapter 26 – Radius of Gyration Calculations - Deriv	Chapter 27 – Single Particle Form Factors - Deriv	Homework

Week 5

	Chapter 28 – Form Factors for Polymer Systems - Deriv	Chapter 31 – Structure Factors for Polymer Systems - Deriv	Chapter 32 – Structure Factors for Particulate Systems - Deriv
	Chapter 33 – Scattering from Fractal Systems - Deriv	Chapter 34 – The Multicomponent RPA - Deriv	Homework

Week 6

	Chapter 35 – Introduction to Polymers	Chapter 37 – SANS from Polymer Solutions - Deriv	Chapter 38 – SANS from Polymer Blends - Deriv
	Chapter 39 – SANS from Block Copolymers - Deriv	Chapter 40 – SANS from Ternary Polymer Blends - Deriv	Homework

Week 7

	Chapter 42 – Phase Diagrams for Micellar Systems	Chapter 43 – SANS from Crystalline Lamellae - Deriv	
	Chapter 44 – SANS from Pluronics - Deriv	Chapter 45 – SANS from Ionic Micelles - Deriv	Homework

Week 8

	Chapter 47 - Elements of Biology	Chapter 48 - SANS from Phospholipid Bilayers Under Pressure	
	Chapter 49 - The Helix-to-Coil Transition in DNA - Deriv	Chapter 50 - SANS from a Protein Complex - Deriv	Homework

Week 9

	SANS Tutorial		Homework Data_anal_Homework_1
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Midterm Exam: Thursday November 3rd

Week 10

	Chapter 52 - SANS from Polymer Blends Under Pressure - Deriv	Chapter 53 - SANS Under Shear	Chapter 54 - Solvation in Mixed Solvents
	Chapter 55 - Clustering in Macromolecular Media - Deriv	Chapter 56 - SANS from Polymeric Materials	Homework Data_anal_Homework_2

Week 11

	Chapter 59 - SANS Resolution with Slit Geometry - Deriv	Chapter 60 - The VSANS Technique - Deriv	
	Chapter 61 - The USANS Instrument	Chapter 62 - Gallery of SANS Data Images	Homework

Week 12

	X-Ray and	Neutron Reflectometry	
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	Neutron Reflectometry	Studies of Thin Films and Multiplayered Materials	No Homework
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Week 13

	Structural Investigations of Membranes of Interest in Biology by Neutron Reflectometry		No Homework
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Week 14

	Application of Polarized Neutron Reflectometry to Studies of Artificially Structured Magnetic Materials	Polarized Neutron Reflectometry	No Homework
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Week 15

	Review Week		Final Exam
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Final Exam: Thursday December 15th at 11:00 am EST