Probing Nanoscale Structures
Fall 2016

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 Last Week
Final Exam: Wednesday December 7th

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 Detectors	Chapter 14 – Sample Environments	Homework

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

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

	Chapter 6 - Introduction to Neutron	Chapter 7 - Neutron Scattering	No Homework

	Scattering	Theory	

	Chapter 8 – Elastic and Quasielastic/Inelastic Neutron Scattering	Chapter 9 – Coherent and Incoherent Neutron Scattering Theory	No Homework

Week 13

	Chapter 15 – The SANS Instrumental Resolution	Chapter 16 – Neutron Focusing Lenses	No Homework
	Chapter 17 – Gravity-Correcting Prisms	Chapter 19 – The Smearing Effect	No Homework

Week 14

	Review Week		Final Exam

Final Exam: Wednesday December 7th