

MENA 5010/9010 Lectures Place: Grupperom FV 414, main book *Thomas Heinzel, Mesoscopic Electronics in Solid State Nanostructures*, Second Edition, 2007 (TH)

Date	Time	Activity	Content/Source
Mon. 17. Jan.	9:15-12:00	Lecture	<u>Introduction to nanophysics</u> : review of main areas of nanophysics, characteristic length scales, details of the course content Video
			Lecture notes, TH, Ch 1 (pp 20-33) and Ch 5 (pp 158-165) – pages in pdf
Fri. 21. Jan.	12:15-15:00	Lecture	<u>Update of solid state physics: basics of crystal structure</u> Video
			TH, Ch 2 (pp 34-74)
Mon. 24. Jan.	9:15-12:00	Lecture	<u>Update of solid state physics: electron structure of materials</u> Video
			TH, Ch 2 (pp 34-74)
Fri. 28. Jan.	12:15-15:00	Practical	<u>Solving nanoscale problems of solid state physics</u> Video
			Ch 2 (pp 34-74)
Mon. 31. Jan.	9:15-12:00	Lecture	<u>Surfaces, interfaces, and layered devices</u> Video
			Ch 3 (pp 76-114)
Fri. 4. Feb.	12:15-15:00	Lecture	<u>Experimental techniques: sample preparation, elements of cryogenics</u> Video
			TH Ch 4 (pp 116-156)
Tue. 8. Feb.	9:15-12:00	Lecture	<u>Magneto-transport properties of quantum films: Landau quantisation, quantum Hall effect, Shubnikov-de Haas oscillations</u> Video
			TH Ch 6 (pp 166-195)
Thu. 10. Feb.	9:15-12:00	Lecture	<u>Graphene: most two-dimensional system imaginable</u> Video
			Lecture notes
Tue. 15. Feb.	9:15-12:00	Lecture	<u>Quantum Wires and Quantum Point Contacts</u> Video
			TH Ch 7 (pp 196-241)
Thu. 17. Feb.	9:15-12:00	Lecture	<u>Electron Phase Coherence</u> Video
			TH Ch 8 (pp 242-265)
Tue. 22. Feb.	9:15-12:00	Lecture	<u>Single Electron Tunnelling</u> Video
			TH Ch 9 (pp 266-291)

Thu. 24. Feb.	9:15-12:00	Lecture	<u>Quantum Dots</u> <u>Video</u>
			TH <u>Ch 10</u> (pp 291-326)
Tue. 1. Mar.	9:15-12:00	Lecture	<u>Nanomechanics</u> <u>Video</u>
			Lecture notes
Thu. 3. Mar.	9:15-12:00	Lecture	<u>Nanophotonics</u> <u>Video</u>
			Lecture notes
Tue. 8. Mar.	9:15-12:00	Lecture	<u>Mesoscopic superlattices</u> <u>Video</u>
			TH <u>Ch 11</u> (pp 328-340)
Thu. 10. Mar.	9:15-12:00	Lecture	<u>Spintronics</u> <u>Video</u>
			TH <u>Ch 12</u> (pp 342-360)
Tue. 15. Mar.	9:15-12:00	Lecture	<u>Superconductivity</u> <u>Video</u>
			Lecture notes
Thu. 17. Mar.	9:15-12:00	Lecture	<u>Nanoscale Superconductivity</u> <u>Video</u>
			Lecture notes
Thu. 24. Mar.	9:15-12:00		Student presentations
Tue. 29. Mar.	9:15-12:00		Student presentations
Thu. 31. Mar.	9:15-12:00		Student presentations
Tue. 5. Apr.	9:15-12:00		Exam
Thu. 7. Apr.	9:15-12:00		Exam