

Introduction to Analytical Electron Microscopy

Sept 4 – Oct 3, 2018

KZ8009 7.5hp <https://sisu.it.su.se/search/info/KZ8009/en>

The course will start on September 4 (Tuesday) at 9:15 in room C516 (5Ö), Arrhenius Laboratory, Stockholm University. Lectures, problem solutions and practical training sessions are conducted at 9:15-12:00 and 13:00-16:00 according to the detailed schedule below. Demonstrations, problem solutions and practical training sessions are the compulsory parts in the course.

Teachers:

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Teaching assistants:

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Course Responsible:

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Literature:

WC: *Transmission Electron Microscopy: A Textbook for Materials Science*, D.B. Williams and C.B. Carter, Springer

ZHO: *Electron Crystallography - Electron microscopy and electron diffraction*, X. Zou, S. Hovmöller and P. Oleynikov, Oxford Science Publication

RE: *Physical Principles of Electron Microscopy: An introduction to TEM, SEM and AEM*, R.F. Egerton, Springer

* Additional materials handed out at the lectures and practical sessions.

The actual date of lab and exercise depends on the number of participants and will be finalized at the beginning of the course.

Week	Date	Teacher		Lecture (9:15 – 12:00)	Literature	Lab (13:00 -16:00) #
36	4/9 (Tue)			9:15 – 10:00 General introduction		
		L1	KJ	10:15 – 12:15 Introduction to SEM	RE: 5	
	5/9 (Wed)	L2	KJ	Introduction to EDS and WDS	RE: 6	SEM lab (Group A) EDS lab (Group B)
	6/9 (Thurs)			SEM lab (Group C) / EDS lab (Group D)		SEM lab (Group D) EDS lab (Group C)
	7/9 (Fri)	L3	KJ	Applications of SEM, EDS and WDS	*	SEM lab (Group B) EDS lab (Group A)
37	11/9 (Tue)	L4	TT	Introduction: electron, interaction with matter, dual nature of electrons	WC:1-3	Introduction of instruments (TEM) & sample preparation (Group A & B)
	12/9 (Wed)	L 5	TT	Instrumentation and Electro-optics	WC: 5-10	Introduction of instruments (TEM) & sample preparation (Group C & D)
	14/9 (Fri)	L 6	TT	Electro-optics and TEM sample preparation	WC: 10	Exercise (Group A, B, C & D)
38	18/9 (Tue)	L7	TW	Basic crystallography	ZHO:2-3	
	19/9 (Wed)	L8	TW	Electron diffraction	WC: 11-18 ZHO: 4-5	Exercise (Group A, B, C & D)
	20/9 (Thurs)	L9	TW	Indexing and determination of unit cell	ZHO: 5	ED lab (Group A & B) Exercise (Group C & D)
39	25/9 (Tue)	L10	TW	Imaging: BF, DF and phase contrast	WC: 22	ED lab (Group C & D) Exercise (Group A & B)
	26/9 (Wed)	L11	TW	CTF and HRTEM with image simulations	ZHO: 6 WC: 27-28	HRTEM lab (Group A)

	27/9 (Thurs)	L12	TT	Introduction to other and state of the art techniques: e.g. C _s -corrected HRTEM, quantitative study, <i>in-situ</i> experiments, etc.	*	HRTEM lab (Group B)
	28/9 (Fri)			HRTEM (Group C)		HRTEM (Group D)
40	2/10 (Tue)	Examination (9:15-14:00)				