TEM Gemini Centre

NTNU
Department of Physics
Department of Materials Technology

Trondheim, July 2023.

Intensive TEM introduction course in September 2023

This course is meant for MSc and PhD students and researchers who plan to use or be involved with transmission electron microscopy (TEM) during their studies, as it gives the basics for reading, understanding, and writing papers including TEM characterization of materials.

Lecture plan:

Both the lectures and demo sessions will be given in **week 36** (4.-6.9.), with lectures in **D5-106 in Realfagbygget**. We start at the hour (**not 15 past!**). Topics covered are basic aspects of TEM for physics and materials science research:

Monday 4th Sept. 9-12	**Lecture 1**	**Introduction and Local Equipment Demonstration**.
Monday 4th Sept. 13-16	**Lecture 2**	**Electron Beam Interaction and Electron diffraction**
Tuesday, 5th Sept. 9-12	**Lecture 3**	**Imaging techniques**
Tuesday, 5th Sept. 13-16	**Lecture 4**	**Analytical Techniques in TEM and STEM**
Wednesday, 6th Sept. 9-12	**Lecture 5**	**Data Processing with Hyperspy, Jupyter & Co**

Lecture notes (ppt) will be handed out. They are made by Ton van Helvoort, Emil Frang Christiansen, Ursula Ludacka and Randi Holmestad. Lectures will mostly be given by Ursula and Emil. The course gives no credits. This intro course is also recommended for PhD students who have no or limited experience in TEM and intend to take the PhD course FY8102 "Electron microscopy and diffraction" that will be given in the same semester.

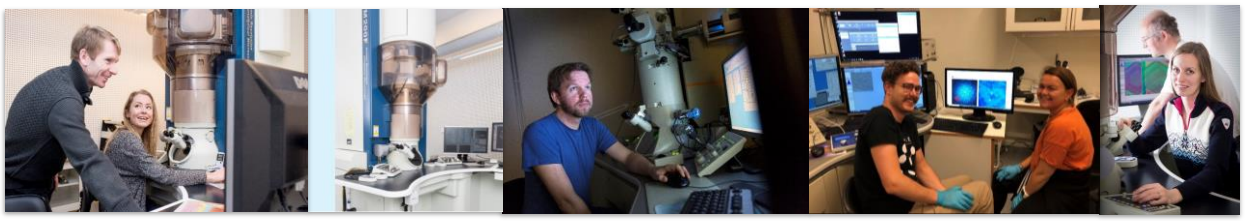
TEM demo sessions:

There will be a short, guided tour to the TEM lab during the first session. We may offer more practical demo sessions where participants will be divided in groups of 3-4 people for TEM sessions of 2-3 hours. Apart from demonstrating basic TEM techniques, the level and content of these sessions are flexible, and will be adapted to the participants. They will not qualify the participants for operator status on the instruments.

Questions and registration: Contact temlab@phys.ntnu.no

TEM Gemini homepage: www.ntnu.edu/physics/temgemini

Registration deadline 21. August 2023.



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For those who will use (S)TEM in depth in their research, the TEM Gemini Centre offers:

PhD-course FY8102 Electron microscopy and diffraction, Fall 2023

The PhD course will focus on diffraction theory and advanced transmission electron microscopy techniques.

Topics covered are (this will be elaborated on during course start-up meeting in week 38):

- Electron scattering theory and diffraction - dynamic electron diffraction
- Scanning TEM, including 4DSTEM
- Aberrations and lens performances
- Detectors
- Differential phase contrast

This physics PhD course will be based on self-study and giving colloquia for each other. We will meet once a week (1-3 hours), starting week 38. The lecture times, curriculum (topics) and presentation schedule will be finalized in week 38. Input and active participation from the students are expected. The intensive TEM introduction course in week 36 will be a part of this course. The oral exam will take place in December 2023. More info will be given at the first meeting in week 38 and via Blackboard. Teachers will be Magnus Nord and Randi Holmestad. Passing the course gives 7.5 credits.

Course & contact details:

For those interested in taking the PhD course, send an email to Randi Holmestad (randi.holmestad@ntnu.no) with your contact details, the name of your supervisor and research topic. We will meet in week 37 to agree about the lecture schedule. Contact us if you have further questions or suggestions.

Magnus Nord (magnus.nord@ntnu.no) and Randi Holmestad (randi.holmestad@ntnu.no).

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