



FKF3260 Characterization Methods for Fibre and Polymer Science, 2025, 7.5 credits

Welcome to the course "Characterization Methods for Fibre and Polymer Science"!

During this course the fundamentals of a variety of experimental methods for characterization and evaluation of polymers, nanoparticles, fibres and their materials will be presented. The course will give a brief background and explanation about the principals of the experimental methods, present typical and illustrative data obtained by each method, give basics of data interpretation and present common pitfalls, anomalies and artefacts.

Course Aims

After the course the student should have the knowledge and ability to

- explain the principals of common experimental methods, which were presented during the course, and how they can be applied for characterization of polymers and fibre-based materials
- at the basic level analyze and interpret data obtained with the main methods presented during the course
- orally and in writing present in principles for a selected characterization method and how it can be used in own research projects.

Course content

The course consists of lectures, home assignments and final seminars with oral presentations given by the PhD students.

Examination

To pass the course you need to...

- I. attend in at least 80 % of the lectures
- II. have approved home assignments coupled to each lecture
- III. give an oral presentation at the final seminar

Prerequisites: Basic knowledge of Fibre and Polymer Science

Lecture rooms: Rånby, Teknikringen 56

Number of places: 30 students (priority for FPT/CBH)

Course fee: Free for PhD students from CBH school. For others 4000 SEK excluding moms.

Lecture schedule 2025 (Preliminary, in Rånby at Teknikringen 56)

- **Fri 4/2 at 13:15-15:00 in Rånby:** NMR – Zoltan Szabo
- **Fri 7/2 at 13:15-15:00 in Rånby:** Thermal analysis – Ulf W. Gedde
- **Mon 10/2 at 10:15-12:00 in Rånby:** AFM techniques – Torbjörn Pettersson
- **Wed 12/2 at 10:15-12:00 in Rånby:** Surface characterization – Lars Wågberg
- **Wed 12/2 at 13:15-15:00 in Rånby:** GC-MS, HPLC, MALDI-MS – Minna Hakkarainen
- **Fri 14/2 at 10:15-12:00 in Rånby:** WAXS/XRD/X-ray scattering and diffraction of nanofiber systems – Tomas Rosén
- **Mon 17/2 at 10:15-12:00 in Rånby:** Permeability and transport property assessment – Mikael Hedenqvist
- **Tue 18/2 at 13:15-15:00 in Rånby:** SEC – Eva Malmström
- **Thu 20/2 at 10:15-12:00 in Rånby:** IR and Raman spectroscopy – Mats Johansson
- **Fri 21/2 at 10:15-12:00 in Rånby:** Thermal dynamics (DLS, SLS, XPCS) – Tomas Rosén
- **Mon 24/2 at 10:15-12:00 in Rånby:** Mechanical properties I (Instron) – Lars Berglund
- **Tue 25/2 at 10:15-12:00 in Rånby:** Synchrotron radiation for characterizing fibre, nanoparticle and polymer materials – Stephan V. Roth
- **Tue 25/2 at 13:15-15:00 in Rånby:** Mechanical properties II (DMTA) – Lars Berglund
- **Thu 27/2 at 10:15-12:00 in Rånby:** SEM/TEM – Anastasia Riazanova
- **Mon 4/3 at 13:15-15:00 in Rånby:** Electrochemical characterization – Mahiar Max Hamedi

Oral presentations, 3x3 hours in March

1. **Mon 10/3 at 09:00-12:00 in Rånby**
2. **Fri 14/3 at 09:00-12:00 in Rånby**
3. **Mon 17/3 at 09:00-12:00 in Rånby**

Examination: The examination will consist of participation during lectures and seminars, home assignments, final assignment and oral presentation at the final seminar.

Home assignments: After each lecture you will either get a specific home assignment handed out by the teacher or if there is no specific home assignment then you should write a short summary of some technique that were presented (~1 A4). In this summary you should especially reflect over how you could use the presented characterization technique(s) to progress in your own research work. If you have already used the techniques, you could also shortly present the already obtained results. These home assignments should be handed in to the teacher of the lecture at latest 2 weeks after the lecture!

Seminars with oral presentations: At the end of the course, you should give a short oral presentation of ~15 minutes including 5 min for questions. There will be three seminar occasions. During your presentation you can present a characterization method of your choice and give examples of how you use it in your own research project.

If you have questions, contact Tobias Bensselfelt (bense@kth.se).