



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: To be announced

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

Planned lectures February 2025

- Thermal analysis – Ulf W. Gedde
- IR and Raman spectroscopy – Mats Johansson
- NMR – Zoltan Szabo
- SEC – Eva Malmström
- GC-MS, HPLC, MALDI-MS – Minna Hakkarainen
- SEM/TEM – Anastasia Riazanova
- Permeability and transport property assessment – Mikael Hedenqvist
- WAXS/XRD/X-ray scattering and diffraction of nanofiber systems – Tomas Rosén
- Surface characterization – Lars Wågberg
- AFM techniques – Torbjörn Pettersson
- Thermal dynamics (eg. DLS, SLS, XPCS) – Tomas Rosén
- Synchrotron radiation for characterizing fibre, nanoparticle and polymer materials – Stephan V. Roth
- Mechanical properties I (Instron) – Lars Berglund
- Mechanical properties II (DMTA) – Lars Berglund
- Electrochemical characterization – Mahiar Max Hamedi

Oral presentations, 3x3 hours in March

1. To be decided
2. To be decided
3. To be decided

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).