FCK3108 Polymer physics including polyelectrolytes – 2026
Homework assignments

Objective

To work with the theory and models presented in the course in relation to your own research. The aim is to improve the fundamental understanding of your polymer systems. It is a good way to truly learn and understand the most essential content of the course for you.

Work progress

Pick 3 topics from the themes below that fit your PhD project and are helpful in your scientific inquiries. Use the course content to evaluate problems within these themes, one for each theme. Clearly define a *scientific question* and then answer it using your recently acquired knowledge.

Example: You are working with a polymeric material that swells in water. Describe this swelling based on a polymer/polyelectrolyte gel theory. Which mechanisms are essential for your system? Can you fit your data to the models? Which experiments do you need to fit your data to the models? Are there any limitations in the theories in relation to your system? Define a need for further development of the theories.

Examination (send by email to bense@kth.se and your assigned peer review partner)

- A report (short and efficient) where you outline the scientific questions, work progress to answer the questions, and evaluate the limitations.
- Peer review report (max 1 page)
- Peer review seminar where you give and receive feedback in pairs.

AI use: You are allowed to use AI or other digital tools to discuss, test, and evaluate ideas. However, you are responsible for any data or ideas presented. The use of AI will be discussed and assessed during the peer-review process.

Themes

Polymers

1. Conformation
2. Solutions
3. Amorphous glassy polymers
4. Semicrystalline polymers

Polyelectrolytes

5. Solutions/conformation
6. Gels
7. Adsorption to surfaces (also nonionic polymers)

Questions are addressed to bense@kth.se