

## Nanoscience III: Molecular nanoscience 5 cr

(At TKK code Tfy 125.4003)

**A multidisciplinary course for eg. chemists, physicists, biochemists, electronics experts and materials scientists wishing to obtain more information on this rapidly developing field.**

Nanoscience is a rapidly developing field in a variety of scientific disciplines. This implies that the most interesting nanoscale events take place in the interface of these different disciplines. For this reason a new teaching program covering fields from physics to biology is established.

It is a two term curriculum with an introductory section (part I, 3 ects) and sections II, III and IV covering nanostructures (5 ects) molecular nanoscience (5 ects) and bionanoscience (5 ects) respectively. Parts I and II take place in Kumpula campus (University of Helsinki) part III in Otaniemi (Helsinki University of Technology) and part IV at Viikki (University of Helsinki). Students from different disciplines aiming at their masters or doctoral thesis are encouraged to take part in the lectures. The Introductory Part I is suitable for all undergraduate students and parts II-IV for master's or doctoral students.

See: <http://www.acclab.helsinki.fi/nanogs/nanocourses.html>

Note: the page requires a username and password. The password will be given to course attendees during the first lectures .

**Place:** Otaniemi, TKK Main building (Otakaari 2), Lecture Hall U264 **Time:** : Period III, 16.1. - 5.3, Mon 16-18, Wed 16-18.

**Extent:** 7 weeks, 2x2 h/week, 3 ov = 5 op. **Person in charge:** [Acad. Prof. Olli Ikkala](#) **Time in education:** Master's or PhD studies Course requires presence on all but 2 of the lectures, and a final exam

#	Date	Time	Title	Lecturer	Notes
1.	16.1	16-18	Supramolecular Science I (Intro, basics, interactions, structures)	Acad. Prof. Olli Ikkala (TKK)	
2.	18.1	16-18	Supramolecular Science II (Supramolecular chemistry and biochemistry)	Prof. Ari Koskinen (TKK)	
3.	23.1	16-18	Supramolecular Science III (Functional molecules, molecular motors, molecular muscles)	Prof. Kari Rissanen (JY)	
4.	25.1	16-18	Molecular self-assembly I (basics, block copolymers, amphiphiles, liquid crystals, polypeptides)	Acad. Prof. Olli Ikkala (TKK)	
5.	30.1	16-18	Molecular self-assembly II (functional and controllable self-assembled polymers and liquid crystals, methods)	Acad. Prof. Olli Ikkala (TKK)	
6.	1.2	16-18	Molecular self-assembly III (block copolymer synthesis, self-assembly in aqueous medium: micelles, vesicles etc, light scattering )	Prof. Heikki Tenhu (HY)	
7.	6.2	16-18	Molecular self-assembly IV (self-assembled ceramics and their applications)	Dos. Mika Linden (Åbo)	
8.	8.2	16-18	Biomolecular self-assembly (protein and polypeptide self-assembly ceramics and their applications, DNA, genetic methods)	Dos. Markus Linder (VTT, TKK)	
9.	13.2	16-18	Nanoparticles I (synthesis, characterization)	Prof. Kyösti Kontturi (TKK)	
10.	15.2	16-18	Nanoparticles II (functionalization)	Prof. Heikki Tenhu (TKK)	
11.	20.2	16-18	Nanoparticles III (properties, applications)	Prof. Kyösti Kontturi (TKK)	
12.	22.2	16-18	Molecular electronics and photonics (conjugated materials, conjugated polymers)	Prof. Ronald Österbacka (Åbo)	
13.	27.2	16-18	<a href="#">Towards devices I</a>	Dr. Sami Franssila (TKK)	
14.	1.3	16-18	Towards devices II (bioapplications)	Research prof. Inger Vikholm-Lundin (VTT)	