

MATR305 Nanophysics and Nanochemistry (2020-2023)



HUOM! OPINTOJAKSOJEN TIETOJEN TÄYTTÄMISTÄ KOORDINOIVAT KOULUTUSSUUNNITTELIJAT HANNA-MARI PEURALA JA TIINA HASARI

- 1. Course title
- 2. Course code
- 3. Course status: optional
- 4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)
- 5. Recommended time/stage of studies for completion
- 6. Term/teaching period when the course will be offered
- 7. Scope of the course in credits
- 8. Teacher coordinating the course
- 9. Course learning outcomes
- 10. Course completion methods
- 11. Prerequisites
- 12. Recommended optional studies
- 13. Course content
- 14. Recommended and required literature
- 15. Activities and teaching methods in support of learning
- 16. Assessment practices and criteria, grading scale
- 17. Teaching language

1. Course title

Nanofysiikka ja nanokemia
Nanofysik och nanokemi
Nanophysics and Nanochemistry

2. Course code

MATR305

Aikaisemmat leikkaavat opintojaksot 530267 Nanofysiikka ja nanokemia, 5 op.

3. Course status: optional

-Which degree programme is responsible for the course?
Master's Programme in Materials Research

-Which module does the course belong to?

MATR3001 Experimental Materials Physics, Advanced Studies
MATR3002 Computational Materials Physics, Advanced Studies
MATR3005 Inorganic Materials Chemistry, Advanced Studies

ATM300 Advanced Studies in Atmospheric Sciences

optional for

- Study Track in Aerosol Physics

-Is the course available to students from other degree programmes?
Yes

4. Course level (first-, second-, third-cycle/EQF levels 6, 7 and 8)

Master's level, degree programmes in medicine, dentistry and veterinary medicine = secondcycle degree/EQF level 7
Doctoral level = third-cycle (doctoral) degree/EQF level 8

-Does the course belong to basic, intermediate or advanced studies (cf. Government Decree on University Degrees)?
Advanced studies

5. Recommended time/stage of studies for completion

An overview of research activities in Nanophysics and Nanochemistry in Kumpula Campus offered in the course is useful at the stage when a future career choice is to be made.

6. Term/teaching period when the course will be offered

The course is offered every year in the autumn during the second teaching period.

7. Scope of the course in credits

5 cr

8. Teacher coordinating the course

Flyura Djurabekova

9. Course learning outcomes

After completing the course you will have an understanding of:

- what is the nanoscience and what is its role in the modern society
- what are the branches of nanoscience in general and what branches are under research in Kumpula Campus

10. Course completion methods

The course is offered in form of scientific overview lectures given by the experts in each field presented during the course.

The 100% attendance is recommended as the lecture notes contain the slides on original research, inviting the students to have critical viewpoints and feedbacks.

The course is completed by submitting weekly short essays on every lecture, where the important aspects given by the lecturer and in the student's own opinion must be highlighted. The final examination is held at the end of the course.

11. Prerequisites

The course "Basics of Nanoscience".

12. Recommended optional studies

Computational Nanoscience, Chemistry of thin films

13. Course content

- Atom-level methods to build and characterise the nanostructures
- Properties of nanoobjects: mechanical, electronic and magnetic, optical
- Physical and chemical methods to form nanoobjects: nanoparticles, nanoclusters, nanopillars/nanowires, nanofilms, bulk nanomaterials
- Carbon-based nanostructures
- Inorganic thin films
- Aerosol nanoparticles

14. Recommended and required literature

Lecture notes.

15. Activities and teaching methods in support of learning

Lectures are given two times a week for 7 weeks. An essay emphasising important and critical points is written after every lecture. The final exam is written at the end of the course.

16. Assessment practices and criteria, grading scale

The essays submitted by students are graded regularly. The final score can be used as a weighting factor up to 20% for the grade of the final exam. No returned essays reduce the overall grade of the final exam by 20%.

17. Teaching language

English.