**Course title:** **AEROSOL AND NANOTECHNOLOGY**

**Institute/Speciality:** **FACULTY OF CHEMICAL ENGINEERING AND TECHNOLOGY** / Engineering of Technological Processes

**Number of contacthours:** 30 hours (lectures)
**Course duration:** 1 semester
**ETCS credits:** **2**

**Course description:** The course will focus on the following learning outcomes:
Students know how to describe disperse systems and can discuss and interpret important unit operations related to Aerosol Technology. Students have an understanding of relevant measurement techniques in the field of Aerosol and Nanotechnology. They can discuss the advantages and limits of these systems. Students can apply the basic knowledge of Aerosoltechnology to relevant technical and scientific problems and further judge relevant unit operations. Students are able to identify relevant scientific work in the field of Aerosol- and Nanotechnology and can independently work out the main findings, used techniques and problems described in these papers.
Furthermore, they are able to solve the discussed problems by using computational tools such as Python or others. The content will be the follows:

a) Introduction into Aerosol- and Nanotechnology:
Explanation of the terms, concepts, industrial, ecological, and scientific relevance of Aerosol and Nanotechnology.

b) Particle Size Distribution:
Explanation of the concepts of size distributions, important statistical measures and how determine the size distribution (analytical and based on Python). Working with distributed values.

c) Particles in a fluid:
Describe and predict the behaviour of single particles in a fluid. Consider the size aspect for Aerosols.

d) Transport of aerosols:
Main concept how Aerosols move. Considering the Navier-Stokes equation for Aerosols. Introduce the concept of Thermophoresis.

e) Separation of particles:
Overview over relevant techniques with a focus on filtration. Highlight the relevance for different current technical problems and processes.

f) Particle growth and decrease
Introducing population balances and their application in modern processes.

g) Carbon based nanoparticles
Discussing the importance of carbon-based nanoparticles, their usage in industry and applications, as well as their synthesis methods.

h) Adhesion forces
Introducing forces acting between particles and their basic concepts, technical importance of agglomeration and the effect on selected processes.

i) Future topics

Outlook into the future of Aerosol and Nanotechnology such as for example nanomachines, quantum computer, or nanoparticles in pharmaceutical applications.

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| **Assessment method:** | Final test |
| **Prerequisites:** | Student should have basic knowledge from physical, inorganic and organic chemistry, electrochemistry and biology |
| **Primary target group:** | all specialties students (Chemical Engineering / Chemical Technology) |
| **Lecturer:** | Prof. Dr.-Ing. Samir Salameh (samir.salameh@fh-muenster.de) |
| **Contact person:** | Prof. Dr.-Ing. Samir Salameh (samir.salameh@fh-muenster.de) |
| **Deadline for application**: | 15th of January for students applying for spring semester |
| **Remarks:** | The course is selectable |