

## 1. Introduction to mechanical process engineering in water treatment.

*Objectives:* To provide basic knowledge and concepts of mechanical process engineering, especially in the context of water technology.

*Contents:* Historical overview, basic concepts, fields of application, relation to water treatment and other engineering disciplines.

## 2. Particles and disperse systems

*Objectives:* Deepen understanding of the properties and characteristics of particles, especially in the context of water treatment.

*Contents:* Fineness characteristics, particle sizes, equivalent diameter, particle shape, particle size distribution, porous systems.

## 3. Statistical description of particle distributions.

*Objectives:* Ability to statistically describe and analyse particle size distributions in the context of water engineering.

*Contents:* Statistical characteristics, methods for determining and interpreting particle size distributions.

## 4. Particle interactions

*Objectives:* Acquisition of knowledge about interactions between particles, especially in water and aqueous solutions.

*Contents:* Attractive and repulsive forces, DLVO theory, aggregation and dispersion of particles in aqueous systems.

## 5. Dimensional analysis

*Objectives:* Application of the fundamentals of dimensional analysis in water-related mechanical processes.

*Contents:* Dimensional systems, Pi theorem, similarity theory, examples from water treatment.

## 6. Forces on particles in the fluid

*Objectives:* Deepen knowledge of forces acting on particles in water and aqueous solutions.

*Contents:* Hydrodynamic drag, gravitational forces, centrifugal forces, adhesion forces in aqueous systems.

## 7. Separation

*Objectives:* Acquire skills in the application and selection of mechanical separation processes specifically for water treatment.

*Contents:* Classifying, sorting, separating, basics of separation techniques.

## 8. Mechanical solid-liquid separation processes in water treatment

*Objectives:* In-depth understanding and application of the specific mechanical separation processes used in water treatment.

*Contents:* Processes and techniques for the separation of solids and liquids, examples and applications from water treatment.