

# THE GUNT LEARNING CONCEPTS IN MECHANICAL PROCESS ENGINEERING

## What does mechanical process engineering involve?

Process engineering is the engineering science of material transformation.

Mechanical process engineering involves the changes in material properties (e.g. particle size), and composition (concentration), due to mechanical effects.

The mechanical effects are forces acting on the materials. These forces may include compression forces, friction forces, impulses, or forces triggered by flow resistances.

The material systems with which mechanical process engineering concerns itself are termed dispersed systems. They consist at least of a dispersed phase and a continuous phase. The dispersed phase usually comprises large numbers of individual particles which are finely distributed (dispersed) in the continuous phase. The dispersed phase largely involves solids, however, both phases may also be liquid or gaseous. Examples of dispersed systems are bulk solids such as sand, ore-bearing rock, suspensions, emulsions and dusts.

## How can the basic processes in mechanical process engineering be classified?

### Basic processes in mechanical process engineering

INVOLVING CHANGE IN PARTICLE SIZE	WITHOUT CHANGE IN PARTICLE SIZE	
Comminution	Separation Methods	Mixing
Agglomeration	Storage and Flow of Bulk Solids	Fluidised Beds and Pneumatic Transport

The processes can essentially be divided into two principal categories. In the comminution and agglomeration (particle size enlargement) processes, the size of solid particles is purposely altered. In the separation, mixing, storage and transport of bulk solids, the particle size usually remains unchanged. The separation methods in many cases involve the separa-

tion of solid, dispersed phases from fluids and the division of solid compounds into fractions with different particle properties.

In fluidised beds, mixing, separation or agglomeration processes may occur, depending on the application.



Prof. Dr. Wolfgang Gorzitzke (Anhalt University of Applied Sciences), our technical advisor on mechanical process engineering

Prof. Gorzitzke advised us when we were setting up this range and contributed his many years of experience in the area of mechanical process engineering.

The basic processes in mechanical process engineering...		...and the appropriate GUNT unit
Comminution	▶	CE 245 <i>Ball Mill</i>
Agglomeration	▶	CE 255 <i>Rolling Agglomeration</i>
SEPARATION METHODS	▶ Classifying	CE 275 <i>Gas Flow Classification</i>
	▶ Sorting	CE 280 <i>Magnetic Separation</i>
	▶ Separation in a Gravity Field	CE 115 <i>Fundamentals of Sedimentation</i>
		HM 142 <i>Separation in Sedimentation Tanks</i>
	▶ Separation in a Centrifugal Force Field	CE 282 <i>Disc Centrifuge</i>
		CE 235 <i>Gas Cyclone</i>
		CE 225 <i>Hydrocyclone</i>
	▶ Filtration	CE 116 <i>Cake and Depth Filtration</i>
		CE 117 <i>Flow through Particle Layers</i>
		CE 287 <i>Plate and Frame Filter Press</i>
CE 283 <i>Drum Cell Filter</i>		
CE 284 <i>Nutsche Vacuum Filter</i> CE 286 <i>Nutsche Pressure Filter</i>		
Mixing	▶	CE 320 <i>Stirring</i>
Storage and Flow of Bulk Solids	▶	CE 210 <i>Flow of Bulk Solids from Silos</i>
	▶	CE 200 <i>Flow Properties of Bulk Solids</i>
Fluidised Beds and Pneumatic Transport	▶	CE 220 <i>Fluidised Bed Formation</i>
	▶	CE 250 <i>Pneumatic Transport</i>