

The GUNT learning concepts of biological process engineering

What does biological process engineering deal with?

Biological process engineering deals with biological mass transformation. The following agents carry out this mass transformation:

- complete living organisms with one or a few cells, such as bacteria, fungi or algae
- biologically active, isolated components of organisms, such as animal or plant cells
- biologically active, isolated components of cells, such as enzymes

Biological process engineering has to create optimal conditions for these organisms, cells and cell components. The scientific findings from the areas of biology, biochemistry, etc. are implemented in industrial-scale processes. Examples of typical processes are:

- production of drugs
- production of chemicals
- production of food
- decontamination of soil, air and wastewater
- production of biomass energy sources



Examples of agents in biological process engineering:

1 *Aspergillus niger*: mould fungus used for the production of citric acid, 2 *Paramecium*: Microorganism for biological wastewater treatment, 3 *Saccharomyces cerevisiae*: yeast for the production of ethanol



Biological treatment stage on a wastewater treatment plant (aeration tank)

Our training systems for biological process engineering

Aerobic processes

- CE 701 Biofilm process
- CE 704 SBR process
- CE 705 Activated sludge process
- CE 730 Airlift reactor

Anaerobic processes

- CE 702 Anaerobic water treatment
- CE 640 Biotechnical production of ethanol
- CE 642 Biogas plant

Aerobic and anaerobic processes

An important distinguishing factor for biological processes is whether the microbiological processes take place under aerobic or anaerobic conditions. Biological process engineering has the task of creating the best possible ambient conditions for the respective microorganisms. In the case of fastidious anaerobic microorganisms this is the absence of oxygen. For aerobic microorganisms, on the other hand, an adequate and constant supply of oxygen must be ensured.

In the case of aerobic metabolism, the energy gain of the microorganisms is higher than during anaerobic metabolism. The aerobic microorganisms reproduce more quickly accordingly and there is more biomass.



PLC with touch screen



CE642 Biogas plant