



## Organic Matter Removal

### Introduction

Due to a relatively high efficiency, activated sludge processes are one of the most popular biological wastewater treatment systems. Depending upon process configuration and operation, the activated sludge process can be able to achieve satisfactory removal of organic matter, but also of certain nutrients such as nitrogen and phosphorus.

While the biological removal of nutrients will be studied in more detail in further chapters, this one introduces and describes general concepts regarding the different components and constraints of activated sludge processes designed and operated for organic matter removal. Thereof, fundamentals to understand the different transformations that take place in the biological reactors of activated sludge systems are discussed. Further, the current chapter also introduces the steady-state model for the design of activated sludge systems performing organic matter removal as a function of the wastewater characteristics and the involved biological transformations. Since the operation and control of activated sludge systems is highly sensitive to the selection of relevant design and operating parameters (such as the sludge age) guidance is provided for the selection of the most suitable and feasible parameters depending upon the (removal) purpose(s) of the plant.

### Aims of the Course

- To introduce the different components and constraints of activated sludge systems performing organic matter removal.
- To describe the transformations that take place in activated sludge biological reactors designed for organic matter removal as a function of the wastewater characteristics and particularly in terms of their biodegradability.
- To present the principles and fundamentals of the steady-state model for the design of activated sludge models performing organic matter removal.
- To provide guidance for the selection of relevant parameters for the operation and control of activated sludge systems achieving organic matter removal.

### Learning Objectives

After the completion of this chapter, the participant will be able to:

- Apply the knowledge on biological wastewater treatment processes and engineering on the design and critical assessment of wastewater treatment systems and configurations performing biological organic matter removal as a function of the environmental, operating, and wastewater conditions and characteristics.