



Course: **Biological processes for Wastewater Treatment**

Lecturer: **Dr. Hamid Zilouei**

92-2

### **Aims:**

The aim of this course is to present an overview of biological processes used in environmental purposes and most commonly for wastewater treatment: role of microorganisms in natural phenomena and their proper applications for treatment of different contaminants and polluted streams, improve and manage the performance of biological systems under optimum operations, kinetics and mathematical models of bioprocess, and their applications for similar real problems in environment and industry.

### **Syllabus**

session

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Introduction,  
Water and wastewater characteristics,  
Environmental Microbiology and Biochemistry,  
Stoichiometry and Energetics of Bacterial reactions,  
Kinetics of bacterial growth,  
Course project, step I  
Biological reactors design and operation,  
Aerobic suspended bioprocesses, activated sludge design,  
Lagoon and oxidation pond,  
Biofilm reactors applications in WWT,  
Anaerobic treatment, suspended and biofilm processes,  
Course project, step II  
Nutrient removal bioprocesses, Nitrification, Denitrification,  
Nutrient removal bioprocesses, Desulfurization,  
Biosorption kinetics of heavy metals,  
Biological gas treatment,  
Soil bioremediation techniques,  
Course project, step III, Student presentation

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### **References:**

- 1- BE Rittmann "Environmental Biotechnology: principles and applications" McGraw-Hill, 2001
- 2- GM Evans, J Furlong " Environmental Biotechnology: theory and applications" John Wiley, 2003
- 3- R Mitchell " Environmental Microbiology" John Wiley, 1992
- 4- GM. Masters "Introduction to environmental Engineering and Science" Prentice-Hall, 1991

### **Course evaluation**

Homework	Course project	Final exam
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