

(2 credits)

001-2-5060

Weekly Lecture Hours	Exercise	Laboratory	Field Trip
2			

- 1) Introduction to biological water and wastewater treatment processes: biological degradation of organic carbon, nitrogen and phosphorous biological assimilation, recalcitrant compounds, pathogenic microorganisms.
- 2) Microbiological parameters in Water quality. Main waterborne pathogens, their significance in water supplies, and typical detectable values. Common units of measures for biodegradable pollutants. Natural and anthropogenic organic solutes.
- 3) Wastewater quality: biological parameters. Municipal wastewater treatment stages. Different schemes for wastewater treatment.
- 4) Biological wastewater and water treatment and requirements: different setups of biological processes and biological reactors. Extensive and intensive processes in biological wastewater treatment. General kinetics and reaction rates in biological systems: applications for biological wastewater treatment processes. Activated sludge and membrane bioreactor processes.
- 5) Sedimentation processes: design of sedimentation/settling tanks, clarifiers and related implications of activated sludge process.
- 6) Integration of process schemes and case studies based on technologies previously mentioned in the course.

**Grading Components:**

3 submitted assignments (40%) and one "home exam" (60%).  
Presence in the lectures is essential.

**Lecturer:** Moshe Herzberg

**Recommended Readings:**

- 1) Handbook of Environmental Engineering Calculations, 2nd edition by C. C. Lee, Shun Dar Lin. McGraw-Hill
- 2) Wastewater engineering treatment and reuse edited by Metcalf and Eddy, McGraw-Hill, 4<sup>th</sup> Edition