

6.4.2023	Lectures and exercises in 286			Laboratory work in the Water lab			
Lecture 3,5 h each, mixture with interactive lecture and exercises	Lecture Topic	Lecturer	Exercise	Common lab work	Group lab work	Lab work instructors	DEADLINES
28.2.2023 13-16.30	Course introduction	Anna Mikola	Introduction to lab-scale reactor and lab project				
2.3.2023 8:30-12	Introduction to microbiology Classification of microbes Identification DEMO: DNA sequencing	Antonina Kruglova	HW 1 Bioinformatic assignment				Group 1: Select your lab timetable
7.3.2023 13-16.30			Lab study material: Basic monitoring of the reactors: Influent fractions Nutrients Sludge analyses  HW 1 Microbiology exercises + reporting of microscopy	LABORATORY WORK Lab reactors  Microscoping (Groups 1&2) Plating	Group 1: Pilot operation and monitoring DO	Ksenija, Oona, Antonina, Aino, Marina,	DL for the self-learning material and quiz on microbiology

7.3.2023 Part of the lab work				<b>Introduction for pilot operation Group 1</b>		Ksenija	
4 9.3.2023 8.30 -12			HW 1 Microbiology exercises + reporting of microscopy	LABORATORY WORK Plating results Microscoping (Groups 3&4)		Ksenija, Antonina, Aino, Oona	Group 2: Select your lab timetable
14.3.2023 13 – 14			1 <sup>st</sup> small exam on microbiology	<b>Introduction for pilot operation Group 2</b> Time tbd	Group 2: Pilot operation and monitoring		<b>Exam 1</b>
5 14.3.2023 14-17	Biodegradability COD fractions toxicity/inhibition Introduction to biological processes	Anna Mikola	HW 2 Biodegradability, organic matter fractions		Anoxic phase	Ksenija, Kateryna	DL Basic monitoring quiz
6 16.3.2023 8.30-12	Activated sludge process Aerobic and anoxic processes, Nitrogen removal  Sludge age  Process design of biological processes (simple approach)	Anna Mikola  Kateryna Tsytlishvili  Anna Mikola	HW 3 Nitrogen removal exercises, sludge age Nitrification design Process design and dimensioning AS/N			Ksenija, Kateryna	Group 3: Select your lab timetable

7 21.3.2023 13-16:30	Algae and fungi processes  Biofilm processes MBR, AGS MFC, bioaugmentation	Danielle Bansfield  Anna Mikola	HW 4 SUMO exercises for N and bioP Biofilm design	<b>Introduction for pilot operation Group 3</b> Time tbd	Group 3: Pilot operation and monitoring BioP	Ksenija, Kateryna	DL HW 1
8 23.3.2023 8.30 -12	Storage processes Phosphorus removal Anaerobic processes  Sulphur reactions and corrosion  Cell functions and growth reaction, stoichiometry and kinetics, Monod  Process design of biological processes (advanced approach)	Anna Mikola  Nina Poutanen  Anna Mikola	HW 5 stoichiometry reaction kinetic Monod Digester design removal/digester/ composting	Preparation for group presentations		Ksenija, Kateryna	Group 4: Select your lab timetable
28.3.2022 13-14			2 <sup>nd</sup> small exam on COD fractions, biological processes, biofilms and N removal etc	<b>Introduction for pilot operation Group 4</b> Time tbd	Group 4: Pilot operation and monitoring Temperature	Ksenija, Kateryna	DL HW 2 <b>Exam 2</b>
9 28.3.2022 14-17	Anaerobic digestion	Viljami Kinnunen				Ksenija, Kateryna	

	Iron reactions and phosphorus recovery  Introduction Viikinmäki WWTP	Lobna Amin  Anna Mikola					
10 30.3.2023 9 -11	Excursion to wastewater treatment plant	Viikinmäki Anna Kuokkanen	Exercises to be completed during and after the visit			Ksenija, Kateryna	DL HW 3
11 4.4.2023 13-16.30	Sludge treatment Composting Drinking water treatment  Air&soil treatment  Removal of micropollutants and antibiotic resistance	Federico Varalta  Anna Mikola  Maria Valtari	Support session the lab project	<b>End of pilot reactor operation</b>		Ksenija, Kateryna	DL HW4
12 6.4.2022	Spring break						
11.4.2023 13:00- 15:00	Summary Course feedback discussion		WWTPcatching results Support session for the lab project				
13.4.2023 9 – 11		Anna Mikola	3 <sup>rd</sup> small exam, bioP, anaerobic processes,				DL HW 5 <b>Exam 3</b>

			advanced process design etc. Support session for the lab project				First draft for the lab project slides
18.4.2023 13:00- 16:00			Laboratory project seminar				
20.4.2023							Submission of lab project outputs