

3.2.2023	Lectures in 286 and homework exercise support sessions every Tuesday at 13:00 starting from 17.1. in Teams and in 247A			LABORATORY WORK (in Water lab)			
Lecture 3,5 h each, mixture with interactive lecture and exercises	Lecture Topic	Lecturer	Exercise	Lab work for some students of the group A/B/C 1/2/3/4	Lab group project	Lab work instructors	DEADLINES
Note! Lab safety instructions for NEW students in the Water lab!! E-learning material + test and a short visit to the lab before starting in the lab!!							Lab safety in MyCourses
Lecture 1 11.1.2023 13 – 16:30	Course introduction Main pollutants in water, air and soil – particulate matter, nutrients, micropollutants Why do we treat water and waste?	Anna Mikola	Introduction to lab-scale reactor and lab project				Select your lab groups A/B/C 1/2/3/4
Lecture 2 13.1.2023 8:30 – 12 (Note Same lecture given on 28.1.)	Removal of dissolved compounds: Gas transfer, Henry's law, stripping Mixing Reminder video of pH and hardness, their control	Anna Mikola Timo Larsson	related demo exercises during lecture homework 1 (4 exercises)	LAB INTRO Group A Water quality analyses, Precipitation jar tests for starting point value for chemical dosing		Juho, Timo, Kateryna, Aino	Pre- assignment in MyCourses!! Group 1: Select your lab timetable
16.1.2023 13 – 16.30				LAB INTRO Group B		Juho,	

				Water quality analyses, Precipitation jar tests for starting point value for chemical dosing		Timo, Kateryna, Aino	
Lecture 3 18.1.2023 13 – 16:30 (Note Same lecture as 13.1.)	Removal of dissolved compounds: Gas transfer, Henry's law, stripping Reminder video: Mixing pH, alkalinity and hardness, their control	Anna Mikola Timo Larsson	related demo exercises during lecture homework 1 (4 exercises)	LAB INTRO Group C Water quality analyses, Precipitation jar tests for starting point value for chemical dosing	GROUP 1 Pilot monitoring (18.-24.1.)	Juho, Timo, Kateryna, Aino, Antti	
Lecture 4 20.1.2023 8:30 - 12	Precipitation and dissolution, coagulation Particle destabilisation, flocculation Chemical water treatment / KEMIRA company	Anna Mikola Outi Grönfors (Kemira)	Related exercises during lecture Homework 2 (3 exercises)			Juho, Timo, Aino	Group 2: Select your lab timetable DL report for Lab intro A
Monday 23.1.2023 13 – 16.30 Only Group 1					Group 1: Flotation tests vs. gravity settler; SS and TS analyses	Timo, Juho, Antti	

Lecture 5 25.1.2023 13 – 16:30	Sedimentation, flotation Thickening Dewatering	Anna Mikola	Related exercises during lecture Homework 3 (3 exercises)	Introduction for pilot operation Group 2	GROUP 2 Pilot monitoring (25.1.-31.1.)	Juho, Timo, Aino	DL report for Lab intro B, C
6 27.1.2023 8:30 - 12	Adsorptive processes, absorption, ion exchange	Oleksii Tomin Riku Vahala	Related exercises during lecture Homework 4 (3 exercises)			Juho, Timo, Aino	Group 3: Select your lab timetable
MONDAY 30.1.2023 13 – 16.30 Only Group 2					Group 2 PAC; colour, DOC, UV254 (+ calibration curve)	Aino, Oleksii	
31.1.2023 16.30 – 17.30			1 st small exam on gas transfer precipitation, flocculation and solid separation				Exam 1
Lecture 7 1.2.2023 13 – 16:30	Disinfection, chlorination, UV, oxidation processes	Pirjo Rantanen (HSY), Kateryna Tsytlshvili	Related exercises Homework 5 (3 exercises)	Introduction for pilot operation Group 3	GROUP 3 Pilot monitoring (1.-7.2.)	Juho, Timo , Aino	DL HW 1

Lecture 8 3.2.2023 8:30 – 12	Filtration theory, surface and depth filtration Membrane processes	Anna Mikola Panu Laurell	Homework 6 (4 exercises)			Juho, Timo , Aino	DL HW 2 Group 4: Select your lab timetable
Monday 6.2.2023 13 – 16.30 Group 3 only					Group 3 UV, ozonation/ ultrasound and chlorination tests; <i>E.coli</i> , analysis	Kateryna, Ksenija, Timo	
7.2.2023 16.30 – 17.30			2 nd small on- line exam on adsorption, oxidation and filtration				Exam 2
Lecture 9 8.2.2023 13 – 16:30	Presentation of HSY Drinking water production and Vanhakaupunki plant NOTE in 286!!	Matti Löksy HSY	Support session for the lab project	Introduction for pilot operation Group 4	GROUP 4 Pilot monitoring (9.- 15.2.)	Juho, Timo, Aino	DL HW 3
10.2.2023 8:30 – 12	NPHarvest and P recovery research Electro-chemical processes	Juho Kaljunen Eveliina Repo LUT				Juho, Timo, Aino	DL HW 4

13.2.2023 13 – 16.30 Group 4 only					Group 4 Nanofiltration tests; TOC, UV254, HPC and conductivity analyses	Juho, Timo, Antti, Panu	
15.2.2023 13 – 16.30	Thermal processes Combustion processes (wet oxidation, pyrolysis) HTC	Anna Mikola Aino Kainulainen VTT Mats Riska Evac	Support session for the lab project	End of pilot reactor operation	GROUP 4 End of pilot monitoring	Juho, Timo	DL HW 5
17.2.2023 8.30 - 12	Support for the lab project report Summary Course feedback discussion	Anna Mikola	3 rd small exam on excursion, EC and thermal processes			Anna, Juho, Timo	DL HW 6 First draft for the lab project report Exam 3
22.2.2023 13 – 16:30	Laboratory project presentations					Aino, Marina, Anna, Juho, Timo, Kateryna	
24.2.2023							Submission on lab project reports