

	Lectures and exercises in 286/287			LABORATORY WORK			
Lecture 3 h each, mixture with interactive lecture and exercises	Lecture Topic	Lecturer	Exercise	Lab work for some students of the group A/B 1/2/3/4	DEADLINES	Lab group project	Lab work instructors
9.1.2019 9:00 – 11:30	Note! Lab safety instructions and test for NEW students in the Water lab!!						
1 9.1.2019 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 1/2/3/4		
2 11.1.2019 8:30 - 12	Removal of dissolved compounds: Gas transfer, Henry's law, stripping Mixing Reminder of pH and hardness, their control	Anna Mikola	related demo exercises homework 1 (4 exercises)	LAB INTRO Group A Water quality analyses, Precipitation jar tests for starting point value for chemical dosing Half of the group	Group 1: Select your lab timetable		Juho, Aino
14.1.2019 13 – 16.30				LAB INTRO Group C			Juho, Aino
3 16.1.2019 13 – 16:30	Removal of dissolved compounds: Gas transfer, Henry's law, stripping Mixing	Anna Mikola	related demo exercises homework 1	LAB INTRO Group B Water quality analyses, Precipitation jar		GROUP 1 Pilot monitoring	Juho, Aino

	pH, alkalinity and hardness, their control			tests for starting point value for chemical dosing Half of the group <b>Start-up of the reactor with the whole group at 16:00</b> <b>Introduction for pilot operation</b> <b>Group 1</b>			
4 18.1.2019 8:30 - 12	Precipitation and dissolution, coagulation	Anna Mikola	Related exercises Homework 2 (3 exercises)		Group 2: Select your lab timetable DL Report for Lab intro A		Juho, Aino
21.1.2019 13 – 16.30 Only Group 1					DL Report for Lab intro C	Group 1: Flotation tests vs. gravity settler; SS and TS analyses	
5 23.1.2019 13 – 16:30	Particle destabilisation, flocculation Sedimentation, flotation Thickening Dewatering	Outi Grönfors (Kemira) Anna Mikola	Related exercises Homework 3 (3 exercises)	<b>Introduction for pilot operation</b> <b>Group 2</b>	DL HW 1 DL Report for Lab intro B	GROUP 2 Pilot monitoring	Juho, Roza
6 25.1.. 8:30 - 12	Adsorptive processes., absorption	Riku Vahala, Roza Yazdani	Related exercises Homework 4 (3 exercises)		Group 3: Select your lab timetable		Juho, Roza
28.1.2019						Group 2	

13 – 16.30 Only Group 2						PAC + GAC; colour analysis	
28.1. 16.30 - 17.30			1 <sup>st</sup> small exam on gas transfer precipitation, flocculation and solid separation		<b>Exam 1</b>		
7 30.1.2019 13 – 16:30	Disinfection, chlorination, UV, oxidation processes	Irina Levchuk	Related exercises Homework 5 (4 exercises)	<b>Introduction for pilot operation Group 3</b>	DL HW 2	GROUP 3 Pilot monitoring	Irina, Juho, Aino
8 1.2.2019 8:30 - 12	Thermal processes Combustion processes (wet oxidation, pyrolysis)  Membrane processes	Anja Oasmaa VTT  Riina Liikanen	Related exercises		Group 4: Select your lab timetable		Irina, Juho, Aino
4.2.2019 13 – 16.30 Group 3 only					DL HW 3	Group 3 UV and chlorination tests; <i>E.coli</i> and ATP analysis	

9 6.2.2019. 13 – 16:30	Electro-chemical processes	Eveliina Repo LUT	Introduction to Vanhakaupunki plant Preparation of exercises for the visit	<b>Introduction for pilot operation Group 4</b>	DL HW 4	GROUP 4 Pilot monitoring	Juho
10 8.2.2019 8:30 – 12	Filtration theory, surface and depth filtration	Anna Mikola	Support session the lab project  Homework 6 (4 exercises)				Juho
11.2.2019 13 – 16.30 Group 4 only					DL HW 5	Group 4 Nanofiltration tests; TOC and conductivity analyses	
11.2. 16.30 – 17.30			2 <sup>nd</sup> small exam on adsorption, oxidation and filtration		<b>Exam 2</b>		
11 13.2.2019 13 – 16.30	Excursion to water treatment plant	Anna Mikola Matti Löksy HSY, visit at the plant 13:00 – 15:00	Exercises to be completed at the plant	<b>End of pilot reactor operation</b>		GROUP 4 Pilot monitoring	Juho
12 15.2.2019 8.30 - 12	Laboratory project presentations Summary Course feedback	Anna Mikola	3 <sup>rd</sup> small exam on excursion, EC and thermal processes		First draft for the lab project report <b>Exam 3</b>		Aino, Marina, Juho, Anna

	discussion						
20.2. 13 – 16:30							
22.2.					Submission on lab project reports		
27.2.					DL HW 6		