

# Environmental protection in chemical technology – laboratory

1. An official language of the practical is English.
2. Students will be allowed to attend the exercises only if they will possess a suitable personal protection equipment (**nitrile** or **certified** laboratory gloves, glasses and a lab coat).
3. Each exercise starts with a test.
  - a. Students who fail the test are obligated to improve their rate within one week, before next term. Otherwise they will not be able to attend the exercise.
  - b. Within the course, only **two** corrections of a test are possible.
4. Students are requested to prepare a suitable printed report after each proceeded exercise. Details will be provided by a tutor.
  - a. To attend to a next exercise students are obligated to submit a report.
5. Presence during the course is obligatory.
  - a. There is one additional term planned.
  - b. It is possible to attend one exercise during additional term, regardless of a reason of failure.
  - c. Any random incidents, that will be a cause of exceeding the absence limit, should be reported at earliest convenience and well documented.
6. Passing the course is conditioned by passing all of the exercises.
  - a. A final rate of a specific exercise will be conditioned by: presence and activity during the classes as well as weighted average of the test and report.

I acknowledge that I understand and accept mentioned above conditions of participation and passing the course

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## **Schedule**

### **GROUP A**

Date	Ex.	
27/02/2019	<b>0</b>	Dr. Joanna Wolska,
06/03/2019	<b>3</b>	Dr. Piotr Cyganowski
13/03/2019	<b>4</b>	Dr. Piotr Cyganowski
20/03/2019	<b>2 &amp; 6</b> (The one part of group will have ex.2, the second ex.6)	Dr. Joanna Wolska
27/03/2019	<b>2 &amp; 6</b> (The one part of group will have ex.2, the second ex.6)	Dr. Joanna Wolska
03/04/2019	<b>1 &amp; 5</b> (The one part of group will have ex.2, the second ex.6)	Dr. Joanna Wolska
10/04/2019	<b>1 &amp; 5</b> (The one part of group will have ex.2, the second ex.6)	Dr. Joanna Wolska
17/04/2019	<b>7</b>	Dr. Piotr Cyganowski, Dr. Joanna Wolska

No.	Exercise	Issues
0	Introduction	
1	Hybrid systems in removal of harmful ions from aqueous systems	Information about: Membrane processes, membrane information (def. of membrane, types of membranes, methods of membranes preparation etc.), information about ion-exchange processes, information about ion-exchange membranes, metallic and metalloid ions in water and hazards associated with organic pollutants
2	Membrane methods in removal of organic pollutants from water	Information about: Membrane processes, membrane information (def. of membrane, types of membranes, methods of membranes preparation etc.), pressure membrane processes, ultrafiltration, organic pollutants in all types water (e.g. ground water, surface water etc.) and hazards associated with organic pollutants
3	Adsorption for removal of organic pollutants from water	Information about: The definition of SORBENTS, The definition of SORPTION PROCESS, The use of sorbents, Characteristics of sorbents, The Beer-Lambert law, Organic pollutants in water (for example phenols)
4	Ion exchange processes in water treatment	Information about: The definition of ion exchange resins, ion exchange process, type of ion exchangers, The principle of ion exchange, Classification of ion exchangers: types, structure, properties, Characteristics of the ion exchange process, The use of ion exchange resins, The global resin manufacturers, Commercial ion exchangers
5	Micellar enhanced ultrafiltration in water treatment processes	Information about: Membrane processes, membranes (def. of membrane, types of membranes, methods of membranes preparation etc.), pressure membrane processes, ultrafiltration, surfactants, information about hybrid processes, harmful pollutants in water and hazards associated with organic pollutants
6	Cloud Point Extraction	Information about: Surfactants, extraction processes (types, methods of extraction etc.); organic pollutants in water (for example phenols and phenol derivatives)
7	Additional term	