



VIRTCHEM

The VIRtual Immersive Education for
CHEMistry and Chemical Engineering



UNIVERSITÀ
DEGLI STUDI
DI MILANO



CHARLES
UNIVERSITY



SORBONNE
UNIVERSITÉ

4EU+ Course “VIRTCHEM project: The VIRtual Immersive Education for CHEMistry and Chemical Engineering”

The provisional preliminary lesson plan is as follows:

Preliminary lessons (distance, online)

Day	Topic	Teacher
10 December 2021: 14:00-16:00	Presentation of Virtchem.	Pirola Carlo, Alessandro Pederetti (UNIMI) Jolivald Claude (Sorbonne University) Luděk Míka (Charles University).
January 2022	Initial VIRTCHEM test to check students background.	Delivered as distance activity, independently by each University
20 January 2022: 14:00-17:00	The Crude Distillation Unit plant.	Pirola Carlo (University of Milano).
21 January 2022: 14:00-17:00	Laboratory of qualitative inorganic analysis – A brief introduction.	Pederetti Alessandro (University of Milano).
28 January 2022: 14:00-17:00	In touch with molecules – How virtual reality works (equipment, what to expect); introduction in nanome software – how to use it.	Luděk Míka, Petr Šmejkal (Charles University).

Milano week (4 days in the week 21-25 February).

The week in Milano is tentatively fixed for the week 21-25 February (4 days). All the students enrolled in the project will attend this period.

In these days, the working program for the students groups will be the following:

Day	Hour	Activity
21 February 2022	9:30-12:30	Presence Lesson “Characteristics, functions and working procedures for the software EYESIM and LabSim” (Carlo Pirola, Alessandro Pedretti).
21 February 2022	14:30-17:30	Visit to the laboratories of the Chemistry Department. Visit to the laboratories of the Pharmaceutical Science Department.
22 February 2022	9:30-12:30	Eyesim virtual exercises (groups 1-5). LabSim virtual exercises (groups 6-9).
22 February 2022	14:30-17:30	Eyesim virtual exercises (groups 6-9). LabSim virtual exercises (groups 1-5).
23 February 2022	9:30-12:30	Eyesim virtual exercises (groups 1-5) LabSim virtual exercises (groups 6-9).
23 February 2022	14:30-15:30	Keynote lecture Prof. Sorbonne University “Theoretical basis of industrial separation unit operations (distillation, liquid-liquid extraction): equilibrium, mass transfer, theoretical separation units, freedom degrees, operational variables to control a process.
24 February 2022	9:30-12:30	Eyesim virtual exercises (groups 6-9). LabSim virtual exercises (groups 1-5).

Paris week (4-7 April 2022).

The week in Paris is tentatively fixed for the days 4-7 April 2022. All the students enrolled in the project will attend this period. In these days, the working program for the students groups will be the following:

Day	Hour	Activity
4 April 2022	9:30-12:30	Presence Lesson “Theoretical basis of industrial separation unit operations (distillation, liquid-liquid extraction): equilibrium, mass transfer, theoretical separation units, freedom degrees, operational variables to control a process.
4 April 2022	14:30-17:30	Cases studies (distillation and liquid-liquid extraction).
5 April 2022	9:30-12:30	Control management in chemical processes.
5 April 2022	14:30-17:30	Introduction to distillation simulation (HYSYS).
6 April 2022	9:30-12:30	Case study on control management.
6 April 2022	14:30-17:30	Keynote lecture Prof. Prague University “How structure of molecules affect their properties”.
7 April 2022	9:00-18:00	Visit of a Total Refinery in Rouen. OR Fablab (initiation to Arduino tools for regulation).
8 April 2022	9:30-12:30	Nanome virtual exercises – The structure of inorganic substances. (for SU students only)
8 April 2022	14:30-17:30	Group 1-5 – Nanome virtual exercises – Biostructures. (for SU students only)

Prague week (11-13 May 2022).

The week in Prague is tentatively fixed for the days 11-13 May 2022. Italian and Czech students enrolled in the project will attend this period. French students will be able to participate as volunteers. Students will work in pairs. In these days, the working program for the students groups will be the following:

Day	Hour	Activity
11 May 2022	9:30-12:30	Invitation to Charles University, Visits to faculty laboratories, Visit of the exposition “Periodic table of elements”.
11 May 2022	14:30-17:30	Group 1-5 – Laboratory practice in inorganic chemistry – The properties of inorganic substances.

		Group 6-9 – Nanome virtual exercises – The structure of inorganic substances.
12 May 2022	9:30-12:30	Group 1-5 – Nanome virtual exercises – The structure of inorganic substances. Group 6-9 - Laboratory practice in inorganic chemistry – The properties of inorganic substances.
12 May 2022	14:30-17:30	Keynote lecture Prof. Milan University (Carlo Pirola and Alessandro Pedretti “Chemical softwares for plant and laboratory analysis”).
13 May 2022	9:30-12:30	Group 1-5 – Laboratory practice in biochemistry. Group 6-9 – Nanome virtual exercises – Biostructures.
13 May 2022	14:30-17:30	Group 1-5 – Nanome virtual exercises – Biostructures. Group 6-9 – Laboratory practice in biochemistry.

Final workshop (May, 20 2022).

In this final action, a closing workshop delivered as distance activity will be organized. Each group will have to discuss a presentation on the work done in the project in general and an in-depth analysis on one of the topics covered in the course or on a particular virtual exercise.

Involved students:

9 students from University of Milano, 9 students from University of Prague, 9 students from University of Paris.