



VIRTCHEM 3 project: The VIRTual Immersive Education for CHEMistry and Chemical Engineering, third Edition

(a.a. 2024/2025)

Call for applications for students enrolled at the University of Milan in the MS programmes *Industrial Chemistry (LM-71)*, *Chemistry (LM-54)*, *Pharmacy (LM-13)*, *Pharmaceutical Chemistry and Technology (LM-13)*

The project is based on an innovative training course in the field of chemistry and industrial chemistry thanks to the use of different types of virtual reality (VR) pieces of software for an immersive experience within the reproduction of chemistry laboratories, an industrial chemistry plant and investigation of structure of molecules. The opportunity to handle three different VR tools will be proposed to students: a molecular chemical laboratory (Nanome, <https://nanome.ai/>), an inorganic analytical chemistry laboratory (LabSim, <https://nova.disfarm.unimi.it/labsim>) and a Crude Distillation Unit industrial plant (Eyesim, <https://doi.org/10.1016/j.compchemeng.2020.106973>). Students will use these immersive programs in rooms equipped with VR workstations. During virtual exercises, specifically prepared according to educational goals, students will collect information and data that will require their interpretation, analysis and discussion in working teams to promote not only their learning but also their soft skills and critical thinking. Data acquisition and analysis in a chemical process are essential concepts to understand and handle. Therefore, in order to enlarge the skills of the students, practical and educational activities using Arduino-type microcontrollers will be proposed to help students understand how to manipulate signals from sensors and then control various actuators. These practical activities will be complemented by the use of an additional digital tool, *Tinkercad*, in order to simulate and prototype some simple circuits, before building them “in real life” in the Fablab. VIRTCHEM will propose immersive experiences in virtual laboratories by organising: preparatory lessons (a lesson of approximately three hours will be offered by each university for a total of 9 hours in January 2025); virtual exercises during the Milano week (February 2025), Paris week (April 2025) and Prague week (May 2025); analysis of the data collected; a final meeting to share the teaching experiences (May 2025).

Involved universities: University of Milan, Sorbonne University (Paris), Charles University (Prague)

Dates and locations of the on-site workshops: Milano (24-28 February 2025), Paris (30 March – 4 April 2025), Prague (12-15 May 2025)

Credits awarded: 3 CFU as extracurricular activities, with grade (grade/30), may be awarded – to be confirmed upon approval of the board of each study programme.

The mobility grant is provided as a lump sum according to the following rates:

- Return travel to and from Paris: 275 euros.
- Return travel to and from Prague: 275 euros.



- Accommodation allowance per night: 79 euros.

Who can apply

Applicants must be regularly enrolled in the MS Programmes in Industrial Chemistry (LM-71), Chemistry (LM-54), Pharmacy (LM-13), Pharmaceutical Chemistry and Technology (LM-13) at the University of Milan for the 2024/2025 academic year and until the end of the educational activity (May 2025).

In order to receive the 4EU+ travel and accommodation allowance, they cannot be a recipient of any other EU grant for stays abroad that overlap, even partially, with the physical mobility period.

Study Content

The programme lasts one term and is structured as follows:

- Preparatory lessons about the basic theory of the correlation of the structure and the properties of the molecules, the analytical methods, the principles of the chemical plants design and the Crude Distillation Unit chemical plants.
- Exercises in presence in Milano, Paris and Prague in laboratories with virtual reality tools to explore the molecules, the chemical laboratory and the chemical plants. Moreover, Arduino Microcontroller tools will be introduced and used.

For further information, the candidates should contact 4euplusmobility@unimi.it.

Application

Please apply by **31/10/2024** via email to:

carlo.pirola@unimi.it and alessandro.pedretti@unimi.it

Please include:

- 1) motivation letter (1 pag. Max),
- 2) transcript of records with the list of all the courses attended in the Bachelor and in the Master Courses with the indication of credits and marks.

Please include in your email: your name, surname, PhD programme, matriculation number (matricola).

Selection process

Up to 8 University of Milan's students (4 from Industrial Chemistry and Chemistry, 4 from Pharmacy and Pharmaceutical Chemistry and Technology) can be selected for the 2024/2025 edition of the Programme.

Candidates will be evaluated on the following criteria:



- Letter of motivation: up to 15 points
- Curriculum vitae: up to 15 points

The selection will be carried out by Prof. Carlo Pirola, Prof. Eleonora Pargoletti and Prof. Alessandro Pedretti.

Selected candidates will be informed by email by the coordinators of the 4EU+ Joint educational activity (Prof. Carlo Pirola and Prof. Alessandro Pedretti) by 15/11/2024. The selection outcome will be posted to <https://www.unimi.it/en/international/study-abroad/international-opportunities>.

Personal data processing

Pursuant to EU Regulation 2016/679 ("General Data Protection Regulation - GDPR") and Legislative Decree no. 196/2003, as amended and supplemented, the University undertakes to keep the information provided by the applicant confidential. All data will be processed only for the purposes of participation in the programme. Information on the enforcement of the GDPR is available on the University website at <http://www.unimi.it/ateneo/73613.htm> - pathway: www.unimi.it > University > Privacy.

Signed

La RETTRICE
(Marina Brambilla)
f.to Marina Brambilla