

## Basic Chemistry Laboratory Experiments using ChemCollective Virtual Lab

<b>Course Title</b>	Basic Chemistry Laboratory Experiments using ChemCollective Virtual Lab
<b>Course Category</b>	Pedagogy / Generalized skills
<b>Relevant Discipline(s)</b>	Chemistry / Pharmacy / Biochemistry / Biotechnology/ Engineering 1 <sup>st</sup> year students
<b>Duration of course in equivalent integer no. of days (min 3 days, 1 day = 6 hrs of lectures/hands on sessions)</b>	3 Days 6 hrs of lectures / hands-on-session / problem-solving-session / feedback on each day
<b>Proposed dates</b>	25-27 February 2021

### Brief Course Description and Course Contents

The ChemCollective Virtual Lab is a simulation of a chemistry lab. It is designed to help students perform laboratory chemistry experiments. The lab allows students to select from hundreds of standard reagents (aqueous) and manipulate them in a manner resembling a real lab. The ChemCollective Virtual Lab software works on Windows, Mac and Linux machines and is available free of charge to all educators and students.

The aim of this workshop is to train the college teachers to provide online chemistry lab experience to the students who missed the practical lab sessions due to ongoing COVID pandemic. This will be useful for students to understand the basic chemistry lab experiments which were supposed to be covered in 1<sup>st</sup> and 2<sup>nd</sup> semester chemistry lab courses.

Although Chemistry labs are extremely important, because of the pandemic, no labs could be conducted in the current semester. It is possible that this situation will continue in the next semester also. ChemCollective Virtual Labs, proposed to be covered in this workshop, can mitigate this difficulty substantially, and has the potential to reduce the number of actual labs required to complete the learning process, whenever the contact labs resume.

The training will help teachers in using the ChemCollective Virtual lab software to develop their own lab courses using the reagents and apparatus available on the software interface.

At the end of this workshop, participants will be able to:

- prepare standard solutions
- dilute solutions and measure pH
- measure density of solids and liquids

- perform experiments on solubility of solids
- determine solubility product
- perform acid-base titrations
- prepare buffer solutions
- perform metal displacement reactions

In addition, the participants will be exposed to advanced topics, such as measurement of heat of reactions (enthalpy), measurement of equilibrium constant and gravimetric analysis.

The workshop will be conducted using a mix of pre-recorded spoken tutorial videos with side by side learning and live lectures. A number of practice problems will also be provided after every topic followed by discussions on them to get a good understanding of each topic.

All participants will get the ChemCollective Virtual Lab software, Spoken Tutorials on ChemCollective Virtual Lab, copies of our slides, video recording of all lectures, several solved problems. Using these all who are interested in conducting ChemCollective Virtual Lab workshops by themselves can do so. They will also get exposed to the collaborative content creation activity of the FOSSEE Project.

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FOSSEE team members will help conduct the hands-on sessions.