

**REGISTER  
NOW!**

X-ray diffraction theory & experiment

Hands-on experience with the use of single crystal  
& powder diffractometers

Microstructural study of polycrystalline materials  
Structure solution of your own crystal

# 2024 X-TechLab Training session

**An intensive Introductory Course in Crystallography and X-ray Diffraction Techniques**  
May 21st - May 31st 2024

**Register until March 29th, 2024**

Learn more : [semecity.bj/programmes/formation-en-cristallographie/](https://semecity.bj/programmes/formation-en-cristallographie/)

# A unique regional training initiative

Advance your knowledge of X-ray crystallography by attending the 2023 X-TechLab training session that will be held in Cotonou from May 21<sup>st</sup> to May 31<sup>st</sup>.

The X-TechLab training session aims to endow the local and regional scientific communities with technical skills that will allow them to use X-ray techniques as tools for solving various problems in their specific fields.



## SKILLS YOU WILL ACQUIRE

The training session will focus on two (2) parallel interrelated axis : **single crystal X-ray diffraction** and **powder X-ray diffraction**.

Depending on the training axis, you will acquire specific skills to :

- ➔ Describe the phenomenon of X-ray diffraction by crystals ;
- ➔ Recognize a good quality crystal ;
- ➔ Identify the suitable crystallization technique for a given study ;
- ➔ Describe the operation of a single crystal diffractometer ;
- ➔ Implement a routine data collection using a single crystal diffractometer ;
- ➔ Solve and refine small-molecule single-crystal structure ;
- ➔ Perform sample preparation ;
- ➔ Describe the operation of a powder diffractometer ;
- ➔ Implement a routine data collection using a powder diffractometer ;
- ➔ Phase identification ;
- ➔ Quantitative analysis.

## WHAT YOU WILL LEARN

**NB :** *The x-ray crystallography courses require some mathematical background. Therefore, it is highly recommended that learners revise some mathematical notions (vector products, matrix operations, tensors, Fourier Transform) prior to the training session.*

	Single crystal X-ray diff action	Powder X-ray diff action
<b>Module I</b>	<b>Fundamentals of X-ray Crystallography</b> (crystalline state, crystal lattice, Miller indices, crystal symmetry, ...)	
<b>Module II</b>	<b>Crystal diffraction theory and experiment</b> (Introduction to X-rays & X-ray sources, Scattering from small crystal and a polycrystalline powder, Instrumentation, Crystal growth, twinning, Polymorphism, ...)	
<b>Module III</b>	<b>Hands-on experience with the use of Equipment</b> (crystal selection & mounting, Recording the diffraction patterns, determining the unit cell geometry and symmetry, measurement of intensities, data reduction.)	<b>Hands-on experience with the use of equipment</b> (sample preparation, Selection of data acquisition strategy, Measurements of diffraction patterns, Data reduction, ...)
<b>Module IV</b>	<b>Crystal structure solution &amp; refinement</b> (Crystal structure solution, refinement, absolute structure determination, interpretation of results & validation, ...)	<b>Polycrystalline material analysis</b> (Phase identification, Rietveld refinement, Quantitative phase analysis, Microstructural properties analysis.)

## WHO CAN APPLY ?

To apply to this course, you must:

- ➔ Hold, at least, a Master degree (or being at Master 1 or 2 level in fundamentals and applied sciences (physics, chemistry, material sciences, pharmacology, geology, etc.;
- ➔ Have single-crystal or powder samples to characterize during the training session.

## HOW IT WORKS ?

The training is an intensive course over two (02) weeks with the opportunity for attendees to work on their own samples. All learners and lecturers will be present in person at Sèmè City in Cotonou, except for a few lecturers who will attend remotely. At the end of the training, the learners will undergo a knowledge test intended to assess the knowledge gained from the

training for each participant.

## APPLY NOW !

Applications are submitted here :

<https://forms.gle/Pfntu7JwaJUoRqcR7>



## COURSE FEES

The overall cost of the training session is 3,200 euros per learner. However, Sèmè City and the French Embassy in Benin have subsidized the 2024 training session for the twenty (20) best candidates. This grant will partially cover accommodation costs. The registration fees for applicants is 80 Euros (52 600 FCFA for Beninese applicants and 160 euros (105 100 FCFA for other nationalities.

# Bright Solutions for Africa

X-TechLab provides scientific communities from Benin and Africa with the necessary skills to use X-ray techniques as tools for solving specific and critical socioeconomic issues, particularly in the health, agriculture, energy and environment sectors.

For more info contact :

**Ayinkè Laleye** : [semecity@presidence.bj](mailto:semecity@presidence.bj)

**Denise Adjabo** : [semecity@presidence.bj](mailto:semecity@presidence.bj)