

**REGISTER  
NOW!**

X-Ray imaging theory & experiment  
Hands-on experience with the use of microtomograph,  
of programming and numeric computing platforms  
MATLAB & COMSOL, and Open Source Software for tomographic  
image data visualization and analysis

# 2024 X-TechLab Training Session

**An Intensive Introductory Course in Material Sciences &  
X-ray Imaging**

From November 18th to 29th 2024

**Register until October 4<sup>th</sup> 2024**

**<https://forms.gle/yrz8Gdffj9ZtxUg79>**

## A UNIQUE REGIONAL TRAINING INITIATIVE

Advance your knowledge in Material Sciences & X-ray Imaging by attending the 2024 X-TechLab training session that will be held in Cotonou from November 18th to 29th.

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 Material Sciences & X-ray Imaging.

At the end of the training, you will acquire specific skills to

- > Describe the principle of X-ray interaction with matter ;
- > Describe the methodology for acquiring a tomographic image ;
- > Describe the operating of an X-ray microtomograph ;
- > Describe the application of X-ray microtomograph ;
- > Develop and implement a data collection strategy using an X-ray microtomograph ;
- > Implement at least one tomographic reconstruction method ;
- > Use COMSOL software for numerical simulation purposes ;
- > Determine material behavior laws that are necessary to carry out a digital simulation ;
- > Explain the main thermal and mechanical characterization techniques of materials as well as the information they provide ;



## WHAT YOU WILL LEARN

The training will be delivered in French, with supporting materials available in English. Our bilingual experts will ensure that both French and English speakers can fully participate. Below is the detailed program of activities:

|        |                                                                                    |
|--------|------------------------------------------------------------------------------------|
| Day 1  | Mathematical Elements for Tomography                                               |
| Day 2  | Introduction to Mathematical Morphology                                            |
| Day 3  | Continuum Mechanics                                                                |
| Day 4  | Thermophysical Characterization and Analysis                                       |
| Day 5  | Composite Materials                                                                |
| Day 6  | Correlation of Tomographic Image                                                   |
| Day 7  | Sample Preparation and Tomographic Images Acquisition                              |
| Day 8  | Implementing Image Correlation Using MATLAB                                        |
| Day 9  | Introduction to Open-Source Tools for Tomographic Image Visualization and Analysis |
| Day 10 | Tomography Applications and Review of Training Outcomes                            |

**NB:** The training courses require some mathematical background and some knowledge in programming and numerical simulation. Therefore, it is highly recommended that learners revise some mathematical notions (vectors, tensors, Fourier transform, Probability and statistics) and basic notions in programming and numerical simulation using MATLAB and COMSOL prior to the training session. Some tutorials on MATLAB and COMSOL for beginners are available on YouTube

## WHO CAN APPLY

Be an engineer or hold a Master degree (or being at Master 1 or 2 level) in fundamentals and applied sciences: Material sciences, Physics, applied mathematics; Hold a project on the development/characterization of materials for applications in construction and public works, transport, packaging, ...

## HOW IT WORKS

The training is an intensive course over two (02) weeks. The particularity lies in the association in equal parts between theory and practice 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. 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/yrz8Gdffj9ZtxUg79>



## COURSE FEES

The overall cost of the training is 3,200 euros per learner. However, Sèmè City has subsidized the 2024 training session. Only the registration fee of 80 euros (52,600 FCFA) will be charged for Beninese candidates and 160 euros (105,100 FCFA) will be charged for candidates from other nationalities. With support from the French Embassy, selected non-resident participants may receive partial support with their accommodation in Cotonou, depending on the availability of funds



For more info : <https://semecity.bj/programmes/formation-sciences-des-matériaux-imagerie-par-rayons-X>

# 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 information visit :[www.xtechlab.co](http://www.xtechlab.co)