

## **Access to CEMUP Laboratories under autonomous equipment operation mode**

### **Rules and access conditions for user credentialing for the autonomous use of a CEMUP laboratory/equipment**

#### **A. Autonomous user credentialing**

Credentialing as an autonomous user (CUA) requires the following:

1. The registration as a CEMUP client (Client Form) and to have a bond to an University or to a Portuguese research institution as a PhD student or as a researcher – by a contract, a grant or another one that can be accepted by CEMUP.

2. The registration in the training course of interest (*Registration in a AUC course*) and the payment of a fee (*i*) that includes the course fee and the fee and the cost for using the equipment for an additional period of experimental work PAT (*ii*), with a validity of 180 days.

3. The participation in a training course includes:

##### **Basic course** (taking place in a period of 2-3 weeks)

- a. Theory lectures – Fundamentals of the technique and equipment characterization (up to 10 participants).
- b. Experimental demonstration and training, with CEMUP samples (up to 2 participants).
- c. Experimental application and training, with samples of the researcher (individual).
- d. Information of the working guidelines and security procedures of the laboratory.

##### **Additional experimental working period (PAT)**

- e. Assisted application and experimental training, with samples of the researcher (individual – PAT).

Making use of the laboratory time (PAT) included in the fee for the complete course, the researcher can book laboratory work sessions, for training under assisted use conditions, using his samples.

4. A partial exemption of the training course can be agreed, based on the CV of the interested researcher or on an accreditation letter from a specialist recognized by CEMUP, and in this case the course fee calculation will be made accordingly.

5. Competence assessment tests (theoretical and practical).

After the laboratory experimental sessions, in the frame of the PAT, required to get adequate competence, the researcher can request a test for competence assessment, necessary for credentialing as autonomous user of the laboratory.

6. With the approval on the competence assessment tests and the delivery of the Term of Responsibility, also undersigned by Head of the Project, an Autonomous User Credential will be issued, identifying the equipment, the scope of application and the level of competence, and a proper autonomous user registration will be made at CEMUP data base.

The credential is valid for one year, and shall be renewed automatically (with the renewal of the Term of Responsibility) if the researcher keeps an updated register at CEMUP and the regular use of the equipment under normal operating conditions.

7. In the event of caducity or revocation, a new credential requires the same procedure as for a first credential, with the partial exemption of the participation in the training course (a. and b.) and the course fee will be calculated accordingly.

(i) *The fee for the course includes :*

**Basic course**

- *A fixed component including the theoretical lectures training (a.) and the use of laboratories in the demonstration periods (b.);*
- *a personal training component (c.)*

**Additional experimental working period (PAT)**

- *a credit for an additional working period WAP (with a specific duration for each technique) for the assisted use of the equipment, that is calculated to the value of the normal hourly cost of the equipment use for the specific user class;*
- *for the AFM training, the probes required for the initial training and demonstration (b. and c.) are included, as well as a kit of 10 probes (for tapping) to be used during the AWP period.*

(ii) *The period PAT included in the fee for the complete course, is intended for the assisted use of the equipment and additional personal training in the analysis of the researcher samples of interest. If a part of this period is used after obtaining the credential (CUA) it will be accounted in agreement with the expected benefit for the autonomous users.*

*In the event of caducity of this course credit, or by decision of the Head of the Project, the remaining value can be used to cover for any work at CEMUP laboratories, until the end of the next year after the credit creation, and it will expire after this date reverting to CEMUP.*

**B. Special access conditions**

**B1. The Autonomous User Credential provides the following benefits:**

1. The possibility of autonomous use of the concerned equipment, within the research project and the class of samples identified in the application form for training, and for the equipment configuration and operation settings specified in the credential, while the CEMUP keeps the right of the supervision the conditions of the use of the equipment, sample characteristics and preparation, through an analyst responsible for monitoring and supporting the user work.
  - a. In each working session, a specific file record will be made with the number and characteristics of the samples and the operation modes of the equipment.
2. The access to use the equipments in the scheduling periods that may be made available for this purpose, including periods outside the normal working hours of the laboratories ( from 12-14 Hours and after 18 Hours), with the benefit of a minor waiting time for the access to equipment.
3. A cost reduction for the use of equipment will be charged at 75% of the tabulated cost, except for AFM that already has a specific chart for the autonomous user.

**B2. The Autonomous User Credential includes the following obligations:**

1. The compliance with the guidelines and procedures for the use of the equipment in agreement with the respective manual and laboratory regulations.

2. The interdiction to make any changes to the experimental configuration (hardware) of the equipment or operation control programs (software), and the interdiction to install or run any additional software on the CEMUP computers.
3. The interdiction to use any accessories, materials or sample preparation procedures that are not made available or recommended by CEMUP, or explicitly approved for that purpose, by the analyst responsible for monitoring and supporting the user.
4. The obligation to use only samples that meet the experimental requirements specified for the equipment, which are in the scope of the user credential and which characteristics are previously agreed by the analyst responsible for monitoring and supporting the user.
5. The immediate notification of the responsible analyst for monitoring and supporting the user, or a CEMUP responsible, in the case of operation error, failure or faulty operation of the equipment, and the interdiction of any autonomous action to solve the problem unless it is included in the emergency procedures.

The violation of any of these obligations leads to the revocation of the user credential.

### C. Training courses for autonomous user

CEMUP will hold courses for the training of autonomous user as often as necessary to answer to the requests (applications), ensuring at least a monthly frequency.

The training courses will have level 1 (N1), in a first phase, and will include the following techniques and equipments:

#### **SEM\_1 – Scanning Electron Microscopy - N1**

**Equipment: FEI Quanta 400FEG ESEM**

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|--|------|
| 1. Theory lectures - fundamentals of SEM and equipment characterization            | 3x3h |
| 2. Demonstration and experimental SEM training, with CEMUP samples                 | 2x3h |
| 3. Application and experimental SEM training with samples of the researcher        | 3x3h |
| 4. Information of the working guidelines and security procedures of the laboratory | 2h   |
| 5. Assisted application and experimental training, with samples of the researcher  | 20h  |

#### **SEM/EDS\_1 – Scanning Electron Microscopy and X-Ray Microanalysis - N1**

**Equipment: FEI Quanta 400FEG ESEM / EDAX Genesis X4M**

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|---|------|
| 1. Theory lectures - fundamentals of SEM/EDS and equipment characterization           | 4x3h |
| 2. Demonstration and experimental SEM/EDS training, with CEMUP samples                | 3x3h |
| 3. Application and experimental SEM/EDS training with samples of the researcher       | 4x3h |
| 4. Information of the working guidelines and security procedures of the laboratory    | 2h   |
| 5. Assisted application and experimental of SEM/EDS, with samples from the researcher | 20h  |

#### **SEM\_2 – Scanning Electron Microscopy - N1**

**Equipment: Jeol JSM6301F**

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|--|------|
| 1. Theory lectures - fundamentals of SEM and equipment characterization            | 3x3h |
| 1. Demonstration and experimental SEM training, with CEMUP samples                 | 2x3h |
| 2. Application and experimental SEM training with samples of the researcher        | 3x3h |
| 3. Information of the working guidelines and security procedures of the laboratory | 2h   |
| 4. Assisted application and experimental training, with samples of the researcher  | 20h  |

## **SEM/EDS\_2 - Scanning Electron Microscopy and X-Ray Microanalysis - N1**

**Equipment: Jeol JSM6301F / Oxford INCA Energy 350**

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|---|------|
| 1. Theory lectures - fundamentals of SEM/EDS and equipment characterization           | 4x3h |
| 2. Demonstration and experimental SEM/EDS training, with CEMUP samples                | 3x3h |
| 3. Application and experimental SEM/EDS training with samples of the researcher       | 4x3h |
| 4. Information of the working guidelines and security procedures of the laboratory    | 2h   |
| 5. Assisted application and experimental of SEM/EDS, with samples from the researcher | 20h  |

## **XPS\_1 – Electron X- Ray Spectroscopy - N1**

**Equipment: Kratos Axis Ultra HSA**

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|--|------|
| 1. Theory lectures - fundamentals of XPS and equipment characterization            | 3x3h |
| 2. Demonstration and experimental XPS, with CEMUP samples                          | 2x3h |
| 3. Application and experimental XPS, with samples of the researcher                | 3x3h |
| 4. Information of the working guidelines and security procedures of the laboratory | 2h   |
| 5. Assisted application and experimental XPS, with samples from the researcher     | 12h  |

## **AFM\_1 – Atomic Microscopy Force - N1**

**Equipment: Veeco Metrology Multimode / Nanoscope IVA**

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|--|------|
| 1. Theory lectures - fundamentals of XPS and equipment characterization            | 3x3h |
| 2. Demonstration and experimental AFM , with CEMUP samples                         | 2x3h |
| 3. Application and experimental AFM, with samples of the researcher                | 3x3h |
| 4. Information of the working guidelines and security procedures of the laboratory | 2h   |
| 5. Assisted application and experimental AFM, with samples of the researcher       | 12h  |

At the start of each course a detailed programme will be provided including all the activities.

Depending of the experience acquired with this access mode and of the researchers interest, other complementary courses will be offered at a later stage that will cover other experimental facilities available in CEMUP laboratories.

### **Course fees for the training of autonomous users**

The fee is set annually and the value is published in the Course registration form.

CEMUP, 15th February 2018

CEMUP Director

Dr. Carlos P. Moreira de Sá