

## Functionnal Oxides

| ECTS | Course (h) |
|------|------------|
| 3    | 18         |

|   |   |
|---|---|
| <b>Mention du master transmettant la fiche UE :</b> | <b>Chimie et Sciences des Matériaux</b>             |
| <b>Composante de gestion de l'UE :</b>              | <b>Faculté des Sciences – Département de Chimie</b> |
| <b>Responsable de l'UE :</b>                        | <b>B. VILQUIN</b>                                   |
| <b>Statut du responsable :</b>                      | <b>MCF</b>  |

### **REQUIREMENTS**

#### **PROGRAMM**

The next information technologies should benefit from the integration of a wide variety of materials, including functional oxides, which allow a wide spectrum of components and systems to be considered in response to major societal, technological or economic challenges. The introduction of these new materials and the continuous miniaturization of systems for more than 50 years have led to new challenges in terms of development, characterization, understanding of properties at micro- or nano-scale and implementation in devices. Functional oxides open also the way to applications in energy harvesting and photocatalysis. These challenges are multidisciplinary and inter-disciplinary.

This UE describes the chemistry, physics, materials science, technology and engineering of moving from material optimized in terms of structure and physical properties to functional device.

The program will be structured as follows:

- Structural and physical properties of functional oxides (6h)
- Elaboration and nanostructuration (6h)
- Characterizations and realization of devices (6h)

#### **SPECIFIC SKILLS**

- Know the different oxide properties (structural and functional) and understand their interesting use in devices
- Know the structure-property relationships and understand the optimization possibilities
- Know the deposition/lithography techniques, and understand the control of different hetero- and nano-structures
- Mobilize a transdisciplinary scientific and/or technical culture
- Understand and formulate the problem (assumptions, orders of magnitude, etc.)
- Use concepts or principles in problem descriptions
- Understand all the scientific and technical dimensions of a scientific and/or technical problem