

# **Subject programs, Semester 3**

## **Mineral Chemistry**

**(3h course + 1h30' Tutorials/week); 67h30'/Semester**

### **Content**

#### **Chapter 1: The Periodic Table**

1. The elements in the periodic table (periods, periodicity of properties, blocks, families)
2. The chemical bond:
  - a. The covalent bond
  - b. The ionic bond
  - c. The metallic bond
  - d. The Van der Waals bond and the hydrogen bond
3. Energy diagram of molecular orbitals
4. Hybridization
5. Polarization of a link.

#### **Chapter 2: Hydrogen**

Natural state, physicochemical properties, preparation of hydrogen, hydrogen compounds (hydrides, hydrogen halides) and their acid-base and oxido-reducing properties.

#### **Chapter 3: Oxygen & Sulfur**

Natural state, physicochemical properties, preparation, use, compounds based oxygen, oxygen reactivity, acid-base and oxido-reducing properties.

#### **Chapter 4: Halogens (Fluorine, Chlorine, Bromine, Iodine)**

In all cases we will study the natural state, the physico-chemical properties, obtaining and using.

#### **Chapter 5: Nitrogen, phosphorus, arsenic and antimony**

Natural state, physicochemical properties, production, ammonia and its properties, oxides and oxacids of nitrogen. Preparation of nitric acid and its use.

#### **Chapter 6: Carbon and silicon**

Physico-chemical properties of carbon and silicon, obtaining, oxides and silicon oxacids, silicates, silica gel, silicones.

#### **Chapter 7: Metals**

1. Alkali metals:
  - Group I of the periodic table: generalities, properties.
  - Sodium: manufacturing, sodium derivatives.
2. Alkaline metals

- Group II of the periodic table: generalities, properties.
- Magnesium: manufacturing, magnesium derivatives.

### 3. block d metals(transition)

- Study of some elements: natural state, properties, obtaining and use

## **Chapter 8: Complexes**

- 1- Concepts of complex (ligands, complexing agents)
- 2- Nomenclature
- 3- Study of chemical bonding in complexes, hybridizations in complexes
- 4- Structures of coordination complexes
- 5- Properties of complexes
- 6- Crystal field theory