**Level**: bachelor

**Course title: CHEMICAL CRYSTALLOGRAPHY**

**Status**: elective

**ECTS**: 5

**Requirements**: none

**Learning objectives**

Obtaining knowledge on fundamentals of crystallography, symmetry and structural chemistry.

**Learning outcomes**

After successfully completing the course, the student is able to:

Differentiate between crystalline and amorphous solids; recognize symmetry elements of molecules and simple crystal structures; describe three-dimensional periodicity of crystal structure; define relationship between diffraction pattern and crystal structure; describe and explain basic structural types; use crystallographic visualization programs and crystallographic databases.

**Syllabus**

*Theoretical instruction:*

Crystalline state of matter. Crystal structure and crystal lattice. Symmetry elements and operations. Symmetry point groups. Crystal systems. Bravais lattices. Space groups. Basic principles of X-ray diffraction. Crystallographic programs and databanks. Basic principles of crystal chemistry. Basic structural types. Classifications of crystal structures by bonding types. Physical properties of crystals. Polymorphism. Phase transitions.

*Practical instruction:*

Geometrical crystallography. Demonstration of crystal structure determination. Use of crystallographic visualization programs and crystallographic databases. Elaboration of selected structural types.

| **Weekly teaching load** | | | | Other: |
|---|---|---|---|---|
| Lectures: 2 | Exercises: 2 | Other forms of teaching: | Student research: | |