**III.2.9** **METAL AND CATALYSIS**

**I. Course description**

**Credit points: 4 ECTS**

**Time commitment**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Lecture | Tutorial/  Exercise | Practice/  Assignment | Lab-work | Total |
| No. of hours | 35 |  |  | 5 | 40 |

**Prerequisites:** General Chemistry, Organic Chemistry

**Recommended background knowledge:**

**Subject description**

The course covers a wide range of subjects going from inorganic chemistry to coordination chemistry, and catalysis using organometals, acid/bases, organic and bioorganic materials. The topic on environmental organometallic chemistry is also included.

**Objectives & Outcome**

* To learn about the principles of inorganic chemistry : properties of the main classes of metals (main group, transition metals, lanthanides and actinides)
* To learn about the structure, formation and properties of metal complexes (coordination chemistry) and organometals
* To be able to predict such properties and structures.
* To learn about the general principles of catalysis.
* To learn about the principles of catalysis with metal complexes and organometals, and the selectivity issues. To be able to predict the outcome of such catalyzed reactions and to apply it to a given synthetic problem.
* To learn about the principles of enzymology and organocatalysis, and to learn about and to predict selectivity issues involved.
* To learn about some important industrial applications of catalysis.

**Assessment/ Evaluation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | Attendance/  Participation | Quizzes | Practical | Lab Reports | Midterm | Final |
| Percentage % | 10 | 20 |  | 10 | 20 | 40 |

**Prescribed Textbook(s):** N/A

Some introductory chapters are based on the textbook « Inorganic chemistry », and slides will be provided.

**II. Course content**

Inorganic chemistry

Coordination Chemistry

Organometallic Compounds in the Environment

General Catalysis

Organometal Catalysis

Acid/base catalysis

Organocatalysis

Bio-organometallic chemistry/enzymatic catalysis

Selectivity in catalysis

(industrial applications: integrated in the chapters

**III. Reference Literature:**

Shriver and Atkins, Inorganic Chemistry, fifth edition

*Organometallic Compounds in the Environment.* P. J. Craig, John Wiley & Sons, Ltd.

Organometallic Chemistry and Catalysis, Didier Astruc, Springer