

# Techniques and equipment for investigating environmental factors (IIIrd Year of study, VIth Semester)

**Credit value (ECTS) 5**

## **Course category**

Domain (Imposed)

## **Course holder:**

**Lecturer PhD. Camelia Elena LUCHIAN**

## **Discipline objectives (course and practical works)**

The course aims to acquire knowledge on equipment and analytical techniques applicable to the detection of chemical pollutants in the environment and their use to investigate the quality of environmental factors (air, water, soil, biota); knowledge of the fields of applicability of instrumental analysis methods; assimilating the the basic concepts and principles with which essential instrumental analytical techniques operate..

The practical works aim at acquiring a set of skills specific to chemical analysis using instrumental methods, including the calibration of instrumentation with applicability in the analysis of environmental components..

## **Contents (syllabus)**

<b>Course (chapters/subchapters)</b>
<b>1. Introduction to the investigation of environmental factors. The parameters followed in the investigation of environmental factors.</b>
<b>2. The impact of human activities on the environment.</b>
<b>3. Environmental quality model</b> 3.1. Air quality - definition, requirements, objectives (national and European legislative framework). 3.2. Water quality - definition, requirements, objectives (national and European legislative framework). 3.3. Soil quality - definition, requirements, objectives (national and European legislative framework).
<b>4. Principles and methods for measuring environmental parameters.</b> 4.1. Measurement of concentrations by the method of absorption of electromagnetic radiation in the substance. 4.2. Measurement of concentrations by FTIR spectroscopy. 4.3. Measurement of concentrations by the atomic absorption method. 4.4. Method of concentrations measurement using gas chromatography. 4.5. High performance liquid chromatography. 4.6. Measurement of concentrations by gravimetric analysis. 4.7. Measurement of turbidity. 4.8 Measurement of dissolved oxygen.

<b>5. Apparatus and equipment for measuring environmental parameters.</b>
<b>6. Procurement and processing environmental data.</b>
<b>7. Methods for bioindicators measurement. Vegetation investigation..</b>

<b>Practicum</b>
<b>1. Determination of dissolved oxygen in water.</b>
<b>2. Determination of exchangeable calcium in the soil by complexometric method.</b>
<b>3. Determination of chlorides in the soil.</b>
<b>4. Spectrophotometric determination of lead in water with dithizone.</b>
<b>5. Methods for turbidity determinations.</b>
<b>6. Determination of oxidisable substances in water and chemical oxygen consumption</b>
<b>7. Determination of lead in water by flame atomic absorption spectrometry</b>
<b>8. Determination of organic pollutants in water (fats, mineral oils).</b>
<b>9. Determination of wastewater cations by paper chromatography.</b>
<b>10. Spectrophotometric determination of soil iron</b>
<b>11. Determination of soil carbonate content</b>
<b>12. Determination of air particulate matter</b>
<b>13. Assessment of the toxicity of chemical pollutants to green algae by biological control methods.</b>
<b>14. Final laboratory test</b>

### References

1. Tehnici și echipamente de investigare a factorilor de, **Camelia Luchian**, 2018, Ed. Stef, Iași
2. Harrison, R. M., 2001, Pollution: Causes, Effects and Control (Fourth Edition), Royal Society of Chemistry, UK.
3. Surpățeanu M., 2004 – Elemente de chimia mediului, Ed. MatrixRom, București
4. Nistor I. D., 2007 - Chimia mediului, tehnici de laborator, Ed. Alma Mater, Bacău

### Evaluation

<b>Evaluation form</b>	<b>Evaluation Methods</b>	<b>Percentage of the final grade</b>
Course	Exam	60%
	Course attendance	10%
Practicum	Practicum activity	10%
	Final laboratory test	20%

### Contact

Lecturer **Camelia Elena Luchian**  
Faculty of Horticulture- USAMV Iași  
Mihail Sadoveanu Alley no. 3, Iași, 700490, Romania  
Phone: 0040 232 407526 –USAMV office, fax: 0040 232 219175  
E-mail: [camelialuchian@uaiasi.ro](mailto:camelialuchian@uaiasi.ro)