

TEACHING DISCIPLINE: ECOTOXICOLOGY (Environmental Engineering, 4th Year of Study, 2th Semester)

Credit value (ECTS): 5

Course category: mandatory

Course holder: Assoc.Prof. Cornelia PRIS CARU, Ph.D.

Discipline objectives (course and practical works)

General objective of the discipline

Dissemination to students of the notions related to toxic substances, toxicity and the factors that influence it, toxicokinetics of xenobiotics (pathway of penetration, absorption, distribution, storage, metabolism and elimination), toxicodynamics of xenobiotics

Specific objectives

Learning the techniques and methods of qualitative and quantitative analysis of substances toxic for the environment;

Correlation of the physical and chemical properties of toxins with the possibilities of detecting and quantifying them in food, flora and fauna;

Assessing the repercussions of their presence in the environment for its quality and integrity, for ensuring the quality of life on Earth.

Contents (syllabus)

Course (chapters/subchapters)
1. The role and the status of the discipline Ecotoxicology among the sciences dealing with the concept of environmental quality
2. Presentation of environmental components as carrying information on the quality of the environment and life on planet Earth.
3. General information on toxicity and chemical substances Definition and classification of toxins according to their origin, dose and effect. The dose-effect relationship. Toxicokinetics (absorption, distribution, metabolization, elimination) and toxicodynamics (toxic impact – organ/tissue/seat = effect). Factors that influence toxicokinetics and toxicodynamics.
4. Ecotoxicological assessment of substances. The lethal dose. Biological magnification. Chronicity index. Chronic toxicity. Acute toxicity. Carcinogenesis. Teratogenesis. Toxicity on immunity. Toxicity on reproduction.
5. Persistent organic pollutants (POP)

<p>6. Toxic substances found in water, soil and air subsequent to agro industrial activities Pesticides (fitopharmaceutical substances).</p> <p>Organoclorurated insecticides (DDT, heptachloride, toxaphene, aldrin, dieldrin, endrin etc.). organophosphorus pesticides (paration, paraoxon, OMPA, TEEP, TEPP etc.). Dioxins and furans. Dinitrophenol insecticides (DNOC, dinex, dibutox). Carbamate insecticides (carbaryl, izolan). Fungicides ((pentaclorfenol, ziram, zinab). Rodenticides ((ANTU, warfarina, fluoroacetate, strychnine); erbicides (ariloxiacizi, urea derivatives , triazinice, dipiridilici derivatives).</p> <p>The eco-toxicological significance of pesticides for the environment</p>
<p>7. Environmental contamination and food and feeder with micetes and mycotoxins. Aflatoxins sterigmatocystins, ochratoxins, trichothecenes, patulins, citrinins, fumonisins, ergot alkaloids etc.</p>
<p>8. Toxin substances resulting from the thermic processing of food, feeder preservation and processing, the use of growth hormones.</p>
<p>9. Metals that contaminate the environment (Pb, Hg, Cu, Cd, As etc.)</p>

Practical works
1. Labour protection rules in the <i>ecotoxicology laboratory</i> . Presentation of the laboratory, devices and instruments characteristic to the ecotoxicology laboratory.
2. Ecotoxicological analysis of water. Qualitative and quantitative determination of ammonium salts from agro-industrial activities and from the putrefaction of organic matters from drinkable and surface waters.
3. Identification and quantification of organic waste oxidizable into fountain water from a certain geographic area of Moldova (Leorda neighbourhood, Bacau County)
4. Qualitative determination and dosing of nitrogen hydrocarbon and ammonium chloride in water
5. Determination of lead and cadmium in drinkable water, surface waters and underground waters
6. Determination of mercury in drinkable water and surface waters
7. Determination of nitrites and nitrates in drinkable water and surface waters
8. Soil analysis. Determination of humidity, acidity and pH
9. Determination of chlorides and oxidizable organic substances in soil suspensions
10. Determination of calcium, magnesium, cadmium and lead in soil suspensions (soil extracts)
11. Determination of the alkaline level of soil suspensions (soil extracts)
12. Determination of cyanides in soil suspensions. Determination of mercury in soil suspensions
13. Analysis of some biologic ecotoxicological indicators in soil (the presence of roundworms)
14. Revision test

Bibliography

1. Gavrilescu Elena (2009) - *Surse de poluare i agen i poluan i ai mediului*, Ed. Sitech, Craiova;
2. Cornelia Prisaru, Anca-Irina Prisaru (2013) - *Ecotoxicologie*, Editura Tehnpress, Iași;
3. Constantin Banu (2008) - *Alimenta ie pentru s n tate*, Editura ASAB, Bucuresti;
4. Constantin Banu,Daniela Ianachi, Camelia Vizireanu, Emilian S hleanu (2011) – *Living food- Dead food, Good food- Bad food*, Editura ASAB Bucureti;
5. Carmen Hura (1995) – *Metode de determinare a reziduurilor de pesticide*, Editura Septentrion, Iași;
6. Nicoleta Macovei (2003) – *O bom chimic : aditivii alimentari*, Editura Christiana, Bucureti;

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Course	Exam	60%
	presence	20%
Practical works	Tests + cours and practical	20%

Contact

Assoc.Prof. Cornelia PRIS CARU, Ph.D.

Faculty of Horticulture - USAMV Iași
Aleea Mihail Sadoveanu nr. 3, Iași, 700490, Romania
Fax: 0040 232 407 506
E-mail: corneliapris@uaiasi.ro