

ECOTOXICOLOGY

(Specialization Environmental engineering, 4th Year of study, 1st Semester)

Credit value (ECTS): 6

Course category: Domain-specific discipline (mandatory)

Course holder: Assoc. Prof. PATRAS Antoanela, PhD

Objectives of the discipline (course and practical works)

Familiarization with the fundamental concepts of the ecotoxicology, necessary to correctly solve the specific problems that the future specialists will encounter.

Knowledge of the operation principles of specific ecotoxicology laboratory technique and of the methods for the study of the main known ecotoxic substances.

Contents (syllabus)

Course (chapters/subchapters)
General considerations of the Ecotoxicology (object of study, place, role and importance among the sciences dealing with the concept of environmental quality, history and perspectives)
Definition of the fundamental concepts of ecotoxicology.
Classification of toxicants according to origin, dose and effect
Dose-effect relationship. Lethal dose.
Toxicokinetics of a chemical substance (absorption, circulation, distribution, storage, accumulation, accumulation, metabolism, elimination)
Toxicodynamics (toxic action at molecular level, toxic action at cellular level, toxic action at organ, apparatus, system level)
Factors influencing toxicokinetics and toxicodynamics.
General concepts on the processes of bioaccumulation, bioconcentration, biomagnification, biodegradation
Ecotoxicity of chemical elements and their compounds: mercury, lead, cadmium, chromium, nickel, beryllium, barium, aluminum, copper, thallium, stibium, fluorine, chlorine, bromine, arsenic, selenium, molybdenum, iodine, manganese, nitrogen (ammonia, aniline, nitrozo- and diazo-derivatives, etc.), carbon (carbon monoxide, carbon dioxide, carbon fingerprinting), etc.
Ecotoxicity of plant protection products (herbicides, insecticides, rodenticides, fungicides)
Ecotoxicity of petroleum products
Persistent organic pollutants (POPs) and their impact on environmental components.
Contamination of the environment with mycetes and mycotoxins. Aflatoxins, sterigmatocystins, ochratoxins, trichothecenes, patulin, zearalenones.
Phytotoxins and algotoxins
Practical activity
1. Introductory notions on the specifics of the Ecotoxicology laboratory
2. Model organisms used in ecotoxicology
3. Product safety data sheet
4. Determination of radiation levels in the environment

5. Determination of sulfates in environmental samples
6. Determination of detergents in surface water
7. Spectrophotometric determination of cyanides in the environment
8. Determination of carbon footprint
9. Phytotoxicity tests during the germination process
10. Tests for phytotoxicity in higher plants
11. Determination of lead in environmental samples
12. Spectrophotometric determination of aluminum in sludge ash
13. Presentation and discussion of individual work assignments.
14. Final laboratory evaluation. Discussion. Recapitulation. Conclusions.

Bibliography

1. Costache Cristina, Modroga Cristina, Ecotoxicologia și evaluarea riscului, Editura Agir, 2006
2. Gavrilesco Elena, Noțiuni generale de ecotoxicologie, Editura Sitech, Craiova, 2008
3. Prisăcaru Cornelia, Prisăcaru Anca Irina, Ecotoxicologie, Editura Tehnopress, Iași, 2013
4. Schuurmann Gerrit, Markert Bernd, Ecotoxicology, Editura Wiley, 1998
5. Tamba Berehoiu Radiana Maria, Mic tratat de ecotoxicologie, Editura: Ars Docendi, București, 2014
6. Căldăraru Florin, Căldăraru Mira, Metode de măsurare și monitorizare a parametrilor de calitate a mediului, Editura Cavallioti, București, 2010
7. Oros Vasile, Elemente de ecotoxicologie și teste ecotoxicologice, Editura Risoprint, Cluj-Napoca, 2011.
8. Pohonțu Corneliu, Ecotoxicologia în practica de laborator, Editura Performantica, Iași, 2016
9. Tudor Iuliana Mihaela (editor), Ghid metodologic de monitorizare a factorilor hidromorfologici, chimici și biologici pentru apele de suprafață din rezervația biosferei Delta Dunării, Institutul National de Cercetare-Dezvoltare Delta Dunării– Tulcea, Editura Centrul de Informare Tehnologică Delta Dunării, 2015

Evaluation

Evaluation form	Evaluation Methods	Percentage of the final grade
Final exam	Written / oral examination	60%
Evaluation of the activity during the semester	Written and oral assessments during the semester	40%

Contact

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