GHENT UNIVERSITY

Course Specifications

From the academic year 2024-2025 up to and including the academic year

Environmental Fate and Management of Pesticides (I003015)

Course size *(nominal values; actual values may depend on programme)*

Credits 5.0 **Study time 150 h**

Course offerings in academic year 2025-2026

A (semester 1) English Gent

Lecturers in academic year 2025-2026

Spanoghe, Pieter LA21 lecturer-in-charge

Offered in the following programmes in 2025-2026	crdts	offering
Master of Science in Environmental Science and Technology	5	A
Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)	5	A
Exchange Programme in Bioscience Engineering: Environmental Technology (master's level)	5	A
Exchange Programme in Bioscience Engineering: Food Science and Nutrition (master's level)	5	A

Teaching languages

English

Keywords

Pesticides, Mode of action, QSAR, Residues, Fate, Toxicity, Human and Environmental exposure, Risk assessment

Position of the course

Pesticides and more specific plant protection products are studied during this course. The lectures handle the different steps of the life cycle of pesticides. The course starts with the identification of a new chemical having pesticides properties, it discusses the different mode of actions and toxicity, the authorization process, the application techniques and distribution and modelling in the environment (water and soil), the pesticide exposure of human (occupational exposure and consumer exposure) and ecosystems, the risk assessment and finally the clean-up of pesticides.

Contents

Theory

1 Introduction to pesticides: mode of action of plant protection products and biocides
2 Authorisation of new pesticides in the EU
3 Application of pesticides on crops
4 Occupational exposure to pesticides during and after pesticide application
5 Consumer exposure to pesticides and food safety
6 Environmental exposure to pesticides: droplet drift, air drift and dust drift
7 Obsolete stocks of pesticides and biopurification systems
8 Environmental fate: soil and water
9 Environmental fate: models used in authorization of pesticide authorization
10 Risk-indicators of pesticides for human and environment
11 Risk-communication on pesticides

Practical exercises

1 Lab: Analysis of pesticides in surface water
2 Lab: Application of pesticides
3 Lab: Analysis of pesticides in food
4 Computer exercise on food safety risk assessment

5 Computer exercise on occupational exposure
6 Computer exercise on aquatic risk assessment
7 Lab: Leaching column experiment
8 Computer exercise on e-fate modelling
9 Class room debate on actual theme on pesticides

Initial competences

1 Knowledge of analytical techniques, representative sampling and validation of analytical methods;
2 Soil and water Chemistry and physics
3 Basic of informatics and statistics.

Final competences

1 Have knowledge on the mode of action, benefits and side effects of the use of plant protection products
2 Have insight in the authorization procedures, models and data needs (monitoring) for plant protection products ensuring safe use pesticides reducing human and environmental pressure
3 Analyze pesticide residues in various matrices and interpret results, including quality of the data
4 Have an in depth knowledge of the quality of residue data
5 Perform human and environmental exposure and risk assessment of pesticides
6 Communicate science and risks about plant protection products to different stakeholders

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Seminar, Lecture, Practical

Extra information on the teaching methods

Lecture
Practicals (groups of 2 students) + practical PC room classes + Reporting (permanent evaluation)
Seminar (debate / life discussion group) – preparation
Excursion

Study material

Type: Slides

Name: Learning material
Indicative price: Free or paid by faculty
Optional: no
Additional information: Slides and relevant documentation placed on UFORA. Software models for pesticide exposure and risk assessment placed on UFORA

References

Course content-related study coaching

Extra clarification from assistant, by e-mail and/or appointment

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

NPE is by evaluation of reports (introduction, objective, material&methods, results&discussion, conclusion, learning) of weekly practicals.

Calculation of the examination mark

Students need to have at least 10/20 for theory and 10/20 for practicals, if not they will fail for the whole course. The end-of-term assessment, the theory, will score for 66.6% of the total, practicals will score for 33.3%.