Universidad Juárez del Estado de Durango

Facultad de Ciencias Forestales

Learning Unit Programme
With an integral professional competences approach

I. LEARNING UNIT GENERAL DATA

1. Learning Unit Name				**2. Code**	
Environmental Toxicology				4103	
3. Academic Unit					
Forestry Sciences Faculty					
4. Academic programme				**5. Level**	
Environmental Management Engineering				Higher	
6. Training Area					
Discipline					
7. Academy					
Biological Sciences Chemistry Academy					
8. Modality					
Mandatory	**X**	**Course**		**Attendance**	**X**
Elective		**Course-workshop**	**X**	**Non-attendance**	
		Workshop		**Mixed**	
		Seminar			
		Laboratory, field practice, etc.			
		Professional Practice			
		Academic Stay			
9. Pre-requirements					
Have studied and passed Biology, Chemistry, Biochemistry, Physics, Ecology, Health and Environment.					

10. Theory hours	Practice hours	Independent study hours	Total hours	Credits
3	2	0	5	5

11. Names of the teachers who participated in the development and/or modification of the programme
Melissa Bocanegra Salazar

12. Date of development	Date of modification	Date of approval
06/10/2013	08/12/2015	16/12/2015

II.LEARNING UNIT SPECIFIC DATA

13. Presentation

The learning unit corresponds to a mixed disciplinary course-workshop course in the Environmental Management Engineering Education Plan. This subject contributes to the acquisition of instrumental knowledge and operational skills in the field of the evaluation of toxic risks, that is, the establishment, characterization, management and communication of the risk associated with toxic and environmental pollutants, in its dimension of aggressors of the ecosystems and human health. So, the evaluation of contamination levels of soil, water, sediments and organisms, by pesticides, hydrocarbons, PCBs or metals, in addition to elucidating their origin (since this can be natural and anthropogenic), lead to recognize the possible effects acute (immediate) and chronic (long-term) toxins that can cause organisms, including man.

Environmental toxicology serves as a basis for learning about: air pollution, soil contamination, water pollution, polluting processes management, solid waste management, water quality and treatment, soil bioremediation and environmental impact assessment.

14. Integral professional competences to develop in the student

Generic competences	**Instrumental** • Capability for analysis and synthesis • Oral and written communication skills • Knowledge of a foreign language **Personal** •Capability for teamwork **Systemic** • Ability to apply theoretical knowledge in practice

Professional competences	**Disciplinary** • Ability to approach environmental problems in a multidisciplinary way • Ability to integrate experimental evidences with theoretical knowledge • Qualitative interpretation of data • Quantitative data interpretation capability **Professionals** • Development, management, monitoring and control of environmental projects
General purpose of the course	Acquire the basic knowledge of Environmental Toxicology that allows students to be aware of the temporal and spatial dimensions of environmental processes that affect the health of populations (climate change, air pollution, soil contamination, water pollution). Know the acute and chronic toxic effects capable of triggering a potentially dangerous process, generated by environmental substances, in test organisms and in the natural environment depending on their concentration and bioavailability. As well as develop the capability to estimate the toxic risks in the health of the populations associated with the presence of pollutants in the environment.

15. Joint of axes
The learning unit articulates the environment, ethics, social responsibility and research so that students develop viable projects within a sustainable framework.

16. Development of the course				
Module 1	**GENERAL CONCEPTS** **INORGANIC ENVIRONMENTAL POLLUTANTS**			
Intended learning	**Learning**	**Learning product(s)**	**Strategies**	**Teaching resources and**

	contents			materials
Defines the toxicology and its most common terms, describes the classifications of toxic agents and the field oftoxicology as well as its application in evaluating the effects on health of toxic agents caused by environmental pollution. Identify routes, routes and types of presentation. Identifies and understands the different types of inorganic contaminants, as well as their effects	Introduction to Toxicology Development and importance of environmental toxicology Basic concepts in ecology and its relationship with environmental toxicology Environmental pollution Basic concepts of environmental toxicology Mutagenesis and environmental carcinogenesis. Environmental teratogenesis Criteria for evaluation of environmental contaminants	• Power Point electronic presentation of the subject corresponding to the module. • Power Point electronic presentation of scientific article applicable to some module topic.	• Knows the subject and performs the analysis of the basic concepts of Environmental Toxicology. • Work collaboratively as team and prepare an electronic Power Point presentation on the topics corresponding to the module and present it to their colleagues for evaluation. • Performs the search for quality scientific articles published in international journals that are applicable to the topics reviewed in the module. Review the content of a scientific article in english and synthesize the information to be	• Electronic and printed bibliography •Computer equipment • Projector •Screen • Equipped classroom

on human health.	Lead Mercury Cadmium Chrome Arsenic		presented (in Power Point) and discussed with your colleagues with which your learning is evaluated.	
Module 2	**ORGANIC ENVIRONMENTAL POLLUTANTS** **ATMOSPHERIC POLLUTION**			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**
Identifies and understands the different types of organic and atmospheric pollutants. Understand the toxic effects caused by presentation to VOCs, PAHs, pesticides and air pollutants.	Volatile organic pollutants Poly-aromatic hydrocarbons Persistent organic pollutants Pesticides Primary and secondary atmospheric pollutants Global effects of air pollution	• Power Point electronic presentation of the subject corresponding to the module. • Power Point electronic presentation of scientific article applicable to some module topic.	• Knows the subject and performs the analysis of the basic concepts of Environmental Toxicology. • Work collaboratively as team and prepare an electronic Power Point presentation on the topics corresponding to the module and present it to their colleagues for evaluation. • Performs the search for quality scientific	• Electronic and printed bibliography •Computer equipment • Projector •Screen • Equipped classroom

			articles published in international journals that are applicable to the topics reviewed in the module. Review the content of a scientific article in english and synthesize the information to be presented (in Power Point) and discussed with your colleagues with which your learning is evaluated.	

17. Performance assessment:

Performance evidence(s)	Performance criteria	Application scopes	Percentage
Short investigations.	In each performance evidence, the following will be evaluated: **Knowledge.-** Expressed in terms of the training areas. **Skills and skills.-** Are actions that allow adapting to different scenarios. **Attitudes and values.-** Is expressed in terms of behaviours.	- Search, selection and analysis of information from different sources. - Use of correct terminology in other learning units. - In the development of oral communication skills.	10%
Power Point presentations on topics of Environmental Toxicology.			30%
Power Point exhibition of scientific article in English applicable to each module.			30% Exhibition 10% Self-evaluation 10% Co-evaluation 10%

			Hetero-evaluation

18. Evaluation criteria:

Criterion	Value
Formative Evaluation	40% Short research and Power Point presentations on topics of Environmental Toxicology.
Summative evaluation	30% Power Point Exhibiteon of scientific article in english applicable to each module.
Criteria summation	100%

19. Accreditation

The accreditation of the learning unit is aligned with the provisions of the regulations of the Forestry Sciences Faculty. It is necessary to approve with a minimum of 6.0. The student who has obtained in the partial examinations a minimum average of 8.5 (eight point five) and 80% of attendance, will be exempt from presenting an ordinary exam, being able to present it if he so wishes, in order to improve his qualification.

20. Information sources

Basic

- Albert, LA. 2005.Curso básico de Toxicología Ambiental. LIMUSA, México 311 p.
- Klaassen, CD y Watkins III, JB. Casarett y Doull. 2005. Fundamentos de Toxicología. 1ª ed. McGraw-Hill/Interamericana de España, Madrid.
- Ming-Ho Y. 2001.EnvironmentalToxicology. Lewis Publishers. Florida.
- Moreno Grau MD. Toxicología Ambiental. Evaluación de riesgo para la salud humana. 1ª ed., McGraw-Hill/ Interamericana de España, Madrid. 2003.
- Repetto, M. 2009. Toxicología fundamental. 3ª edición. Ed. Díaz de Santos.
- Walker CH, Hopkin SP, Sibly RM, Peakall DB. 2001. Principles of ecotoxicology. 3º ed., Taylor & Francis. London

Complementary	• Capó Martí, M. 2002. Principios de Ecotoxicología. Diagnóstico, tratamiento y gestión del medio ambiente. Ed. McGraw-Hill Profesional. • Wilson Albert. 2001. Environmental Risk: Identification and Management. Ed. Lewis Publisher, 394 pp. • EBSCO HOST
21. Profile for the teacher who imparts this learning unit	
Have a bachelor's degree in Biology, Chemistry or related area. Preferably with a Master or Doctorate degree. Professional university experience as a teacher in front of a group. Ability to work under pressure and in teams.	