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**	
Hazardous waste management				**8506**	
3. Academic Unit					
Forestry Sciences Faculty					
4. Academic programme				**5. Level**	
Environmental Management Engineering				**Bachelor's degree**	
6. Training Area					
Discipline					
7. Academy					
Environmental Engineering					
8. Modality					
Mandatory	**X**	**Course**	**X**	**Attendance**	**X**
Elective		**Course-workshop**		**Non-attendance**	
		Workshop		**Mixed**	
		Seminar			
		Laboratory, field practice, etc.	**X**		
		Professional Practice			
		Academic Stay			
9. Pre-requirements					
Environmental Biology, Health and Environment, Environmental Toxicology, Soil Pollution and Water Pollution					

10. Theory hours	Practice hours	Independent study hours	Total hours	Credits
4	1	0	5	5

11. Names of the teachers who participated in the development and/or modification of the programme
M.C. Jorge Armando Arámbula Salazar

12. Date of development	Date of modification	Date of approval
January 20 th 2016		October4th 2017

II. LEARNING UNIT SPECIFIC DATA

13. Presentation

The waste generated is a reflection of the forms of production and consumption of the societies in which we live, so that their management must adapt to the changes that occur in both processes. As a result of globalization, the economy and trade, practically all countries are seeing changes in the composition and volume of waste, in particular, Mexico is one of the countries that has signed international trade agreements after signing the agreement Free Trade Agreement FTA with North America (United States and Canada). The global vision of waste management has also changed and has been influenced by the adoption of international environmental conventions on the matter or aspects related to its management, such as the Basel Convention, the Stockholm Convention and the Change Agreement Climate, of the United Nations Organization. These Agreements promote the prevention of the generation of waste, its use through its reuse, recycling or environmentally adequate recovery.

The Official Mexican Standard NOM-052-SEMARNAT-2005 indicates the procedure to be followed by the waste generator to determine if its waste is hazardous or not. The hazardous wastes by its characteristics are those that present one or more of the following properties: corrosive, reactive, explosive, flammable, and toxic to the environment and causing biological infection. This material presents the necessary bases to determine what are the hazardous wastes and how to handle them, also presents a brief study on the main Mexican official standards related to hazardous waste. In the Educational Plan of Environmental Management Engineering, the handling of hazardous waste is related to the following subjects: Pollution Processes, Air Pollution, Soil Pollution, Water Pollution and Soil Bioremediation.

14. Integral professional competences to develop in the student

Generic competences	Instrumental: Capability for analysis and synthesis, Capability for organization and planning, Oral and written communication, Knowledge of a foreign language, Computer skills related to the field of study, Information management capability, Problem solving and Decision making Personal:

	Team work, Work in an interdisciplinary team, Critical thinking, Ethical commitment Systemic: Autonomous learning, Creativity, Leadership and entrepreneurial spirit, Motivation for quality, Sensitivity in environmental issues, Ability to apply knowledge in practice, use of the internet as a means of communication and as a source of information, Ability to communicate with people not experts in the field.
Professional competences	**Disciplinary (know)** • Planning, management and conservation of natural resources. • Economic valuation of goods, services and natural resources. • Ability to address environmental problems in a multidisciplinary manner. **Professionals (know how)** • Design and execution of environmental education programs. • Development, management, monitoring and control of environmental projects. • Management of the natural environment. • Waste disposal and control planning.
General purpose of the course	General Objective: The student knows the legal and regulatory framework that regulates the handling, transportation, treatment and final disposal of hazardous waste as well as the parts that make up the facilities used to store, confine, recover, recycle, treat or eliminate these products.

15. Joint of axes

The learning unit is articulated with the transversal axes established from the educational model and congruence and strengthen the axes of research, ethics, values and environmental awareness. The unit is integrated into the disciplinary training area

16. development of the course

Module 1	Hazardous waste in general			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**
Characteristics, identification	Generalities	• Power Point presentation	Power Point presentation Summary of topics.	Computer, internet, white-board, marker for

procedure, classification and lists of hazardous waste.	1.1 Types of waste. 1.2 Characteristics. 1.3. Identification procedures. 1.4 Classification. 1.5 List of hazardous waste Practice 1. Determine the final disposal of Hazardous Waste in a Mine	• Summary of topics. • Practice report. • Realization of work. • Exam.	Practice report. Realization of work. Exam.	whiteboard, projector, multimedia presentations, referred bibliography.
Module 2	Hazardous biological infectious waste (RPBI)			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**
Classification of hazardous biological infectious waste (RPBI). Effect on the environment and management specifications of the (RPBI)	Generalities 2.1 Environmental protection. 2.2 Environmental health. 2.3 Hazardous biological-infectious waste. 2.4 Classification and management specifications. Practice 2 Observe compliance with NOM-087-ECOLSSA1-2002 within 450 Hospital.	•Power Point presentation • Summary of topics. • Practice report.	Teacher presentation. •Analysis • Summary of the topics •Guided visit	Computer, internet, white-board, marker for whiteboard, projector, multimedia presentations, referred bibliography.
Module 3	Zoonosis and toxic substances that affect the human being			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**

Analyses and identifies the different zoonosis and determines the toxic substances that affect human beings.	Generalities 3.1 Outdated drugs 3.2 Trichinosis. 3.3 Brucellosis. 3.4 Salmonellosis. 3.5 Cysticercoids. 3.6 Avian Flu. 3.7 Rage 3.8 Malignant Pustule 3.9Pesticides and poisons	•Power Point presentation • Summary of topics.	Teacher presentation. • Analysis • Summary of the topics	Computer, internet, white-board, marker for white-board, projector, multimedia presentations, referred bibliography
Module 4	Activities that generate hazardous waste			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**
Identifies the hazardous waste management processes in industrial, metallurgical activities	Generalities 2.1 Environmental protection. 2.2 Environmental health. 2.3 Hazardous biological-infectious waste. 2.4 Classification and Management specifications. Practice 2 Observe compliance with NOM-087-ECOLSSA1-2002 within 450 Hospital.	Power Point presentation • Summary of topics. • Practice report	Teacher presentation. •Analysis • Summary of the topics •Guided visit	Computer, internet, white-board, marker for whiteboard, projector, multimedia presentations, referred bibliography.

Module 5	Official Mexican regulations related to hazardous waste			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**
Analyses and recognizes and identifies the different Mexican Official Norms related to hazardous waste	5.1 National and International agreements related to the management of hazardous wastes. 5.2 National Laws and regulations related to control and management of hazardous wastes (LGPGIR, LEEGPA). 5.3 SEMARNAT regulations 5.4 STPS regulations 5.5. SCT regulations	Power Point presentation • Summary of topics.	teacher's introduction • Analysis and synthesis of topics.	Computer, internet, White-board, marker for white-board, projector, multimedia presentations, referred bibliography

17. Performance assessment:

Performance evidence(s)	**Performance criteria**	**Application scopes**	**percentage**
Work report Video report Electronic presentations Topics summary Practice Report Exam	Fulfilling what is established in the corresponding rubric for the different products. - delivered in time and form. - Content and structure requested. - Clarity in discussion or conclusions. - glossary -bibliography.	Regional, national	Work report, video report, electronic presentations, topics summary and practice report (70%) Exam 20% Formative Evaluation 10%

18. Evaluation criteria:

Criterion	Value
Formative Evaluation	Teamwork, attendance and punctuality, timeliness in delivery, attitude and respect for people and property. 10%
Summative evaluation	Form and content of products, management of the files, handling of the debate, daily participation in class, written test results, field practice report. 70%; exam 20%
Criteria summation	100%

19. accreditation

The ideal condition is that the development of the competition is evident and adheres to the percentages established in the different criteria, however minimums are established to assess the degree of mastery of the competence and obtain the credits of the Learning Unit, in accordance with the following: 50% of their performance or summative evaluation; 10% of the formative evaluation; (self- assessment and co-evaluation).

20. Information sources

Basic	Baird, Colin. 2001. Environmental Chemistry. Reverté Mexicana, S.A. Mexico. 622 pp. Regional Ministry of the Environment: Community of Madrid. 2000. Metal coatings sector. Mundi-Press Mexico. 124 pp. Gómez-Orea, D. 2002. Evaluation of Environmental Impact. A preventive instrument for environmental management. Mundi-Press Mexico. 749 pp. Jiménez-Cisneros, B.E. 2002. Environmental pollution in Mexico. Causes, Effects and Appropriate Technology. Lime. Mexico. 925 pp Kiely, Gerard. 2003. Environmental Engineering. Fundamentals, environments, technologies and management systems. McGRAW-HILL. Mexico. 1331 pp. Seoánez-Calvo, Mariano. 2001. Urban Environmental Management Treaty. Mundi-Press editions. Spain. 395 pp. Wark, K. and Warner, C.F. 2002. Air pollution. Lime. Mexico. 650 pp. Tyler Miller, G. Jr. 2007. Environmental Science: Sustainable Development, a comprehensive approach. 8ed. Thomson Learning. Esp. 119 pp.
Complementary	Conesa Fernández-Vitora, Vicente. 1997. Environmental Audits. Methodological Guide. 2ed. Mundi-Press editions. Spain. 552 pp.

Eweis, Juana. 1999. Biorrecuperación principles. Treatments for the decontamination and regeneration of soil and groundwater through biological and physical-chemical processes. McGRAW-HILL. Mexico. 327 pp.
Glynn, Henry and Heinke, Gary. 1999. Environmental Engineering. 2ed. Prentice Hall, Mexico. 800 pp. Harrison, read. 1996. Environmental Audit Manual. Hygiene and Safety 2ed. McGRAW-HILL. Mexico. 676 pp.
La Grega, M. and et al. 1996. Toxic Waste Management. Treatment, elimination and recovery of soils. Vol. I. McGRAW-HILL. Mexico. 642 pp.
La Grega. M. et al. 1996. Toxic Waste Management. Treatment, elimination and recovery of soils. Vol. II. McGRAW-HILL. Mexico. 1261 pp.
Morris-Levin and Gealt Michael. 1997. Biotreatment of toxic and dangerous waste. Selection, estimation, modification of

21. Profile for the teacher who imparts this learning unit

University Degree with Master's or Doctorate in Biochemistry or Environmental Engineering
University professional experience as a professor in the area.
Teaching experience with the management of the chair with large groups of students.
Have systematically evaluated student performance and developed teaching strategies to promote a more active learning environment in the area of biochemistry or environmental engineering
Proactivity. Flexibility in working hours. Responsibility. Organization. Excellent interpersonal and communication relationships.
Demonstrated ability to work in a team. Ability to work under pressure. Oriented to results