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**	
Pollutant Processes Management				**8498**	
3. Academic Unit					
FORESTRY SCIENCES FACULTY					
4. Academic programme				**5. Level**	
Environmental Management Engineering				**Higher**	
6. Training Area					
Disciplinary					
7. Academy					
Environmental engineer					
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					
Have studied and approved the following Learning Units: Environmental Education, Critical and Creative Thinking Skills, Ecology, Chemistry,					

Environmental Toxicology, Thermodynamics, Health and Environment, Air Pollution, Environmental Pollution and Geographic Information Systems.

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
M.C. Sandra Viviana Jáquez Matas.

12. Date of development	Date of modification	Date of approval
18/02/2016	10/082017	Waiting approval

II. LEARNING UNIT SPECIFIC DATA

13. Presentation

The learning unit of Pollution Processes Management is part of the specific competences of the Educational Program of Environmental Management Engineering, this competition is; Consultancy and evaluation of environmental impact and forms the training route for students to develop specific competencies, which are related to the profile of graduation and are the following: The graduate provides consulting services and strategic assessment to companies and institutions with regarding environmental impact based on ethical and sustainability criteria. The learning unit is also related to other aspects of the graduation profile, such as the management and management of water, soil and air quality and treatment, addressing it within the processes that generate these types of pollution. It also provides the basis for the environmental impact assessment learning unit.

In the development of the learning unit, different economic activities are studied and analysed in order to identify and analyse the environmental effects, as well as to know and propose alternatives and / or preventive measures, mitigation and / or compensation. All this from within the process that generates the environmental impacts. In the first instance, sources of pollution are identified in economic activities in the primary sector (agriculture, mining, oil extraction, among others), secondary (processing, manufacturing) and tertiary (services, gas stations, gas). Then the processes of economic activities are analysed generically in order to identify the effects to the environment that this activity provokes, to later analyse and classify the effects in soil, air, water and biota. The analysis develops under the sustainable development approach without losing sight of the economic, social and environmental aspects. Once the analyses are finished, proposals for mitigation or compensation measures for the environmental effects caused by the activity are made. It also refers to the existence of certainty of the realization of a future environmental damage, that is, a predictable damage, and as a consequence of this, the necessary measures can be adopted in order to anticipate its production, in any case, be diminished or Neutralize the damage to the environment. In this learning unit there is a first introductory approach to the identification of environmental impacts (effects) related to

different processes generated by human activity. In addition, the affected environmental components are identified as they are; air, soil, water and biota.	
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. • Ability to manage information. • Problem resolution. Personal • Ability to work in an interdisciplinary work team. • Ethical commitment. • Critical thinking. Systemic • Autonomous Learning. • Creativity • Sensitivity to environmental issues. • Ability to apply theoretical knowledge in practice.
Professional competences	Management of the natural environment • The graduate manages natural spaces and their use, assessing environmental risk and supported by advanced technologies with ethical and professional criteria. Disciplinary (know) • Planning, management and conservation of natural resources. • Economic valuation of goods, services and natural resources. • Analysis of exploitation of resources in the context of sustainable development. Professionals (know how) • Design and application of sustainability indicators. • Development, management, monitoring and control of environmental projects. • Restoration of the natural environment.

General purpose of the course	Generically known different economic activities in order to identify and analyse the environmental effects that these cause, likewise know and propose alternatives and / or measures of prevention, mitigation, compensation and / or control. All this analysing the process that generates the environmental impacts.

15. Joint of axes

The learning unit is articulated with the environment, social responsibility and research in a way that is related to the other areas (basic, disciplinary, terminal and integral) in order for students to develop viable projects from the economic point of view, ecological and social within a framework of sustainability.

16. development of the course

Module 1	Basic concepts.			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**
Know, identify and analyse the basic concepts of learning content.	Diagnostic. 1.1 Concepts of pollution (Physical, biological and chemical), contaminants, polluting processes and management. 1.2 Environmental components. 1.3 Pollution and effects on soil, water, air, flora,	• Brainstorm on the white-board on What did they do? And what did they learn? In the learning units of: Chemistry, Ecology, Environmental Toxicology, Thermodynamics, Instrumental Analysis, Health and the Environment, Air Pollution. • Construct a conceptual map about basic concepts. • Perform a rehearsal of each video. • Presentation of written exam.	Evaluate the previous knowledge of the students. • Exhibition by the teacher. • Conceptualize, relate and identify differences between the concepts. • Recapitulate, understand, analyse, integrate and find practical application to the knowledge acquired in the Module. • Knowledge studies.	Computer, internet, projector, multimedia presentations, reading of documents, videos, evaluation instruments, referred bibliography.

	fauna and anthropogenic. 1.4 Sources of contamination (Primary, secondary and tertiary sectors). 1.5 Environmental Resilience. 1.6 Toxicity, toxicity And bioaccumulation. 1.7 Mitigation, Prevention, compensation and control measures. 1.8 Introduction Videos (the history of things and trophic chains).			
Module 2	Management of polluting processes.			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**
Know and analyse different economic activities and in order to identify and analyse the effects on the environment,	2.1 Process flow diagrams. Management of polluting processes in: 2.2 Primary sector; • Mining.	Team work to investigate and expose processes, impacts / effects on the environment and prevention, mitigation, compensation and control measures. • Individual: flowcharts of the different	Exhibition by the teacher. • Know, analyse and interpret different economic activities and in order to identify and analyse the effects on the	• Computer, internet, projector, multimedia presentations, reading of documents, videos,

as well as the measures of prevention, mitigation, compensation and control of these impacts.	• Oil extraction. • Farming. • Livestock • Forest exploitation. • Fishing. 2.3 Secondary sector; • Paper industry • Brickwork. • Generation of thermoelectric energy and generation of hydroelectric power • Brewing industry. 2.4 Third sector; • Gas stations and gas stations.	processes identifying in each stage the effects to the environment and the measures of prevention, mitigation, compensation and control of these impacts. • Report visit to the mining unit. • Report visit to the paper industry.	environment, as well as the measures of prevention, mitigation, compensation and control of these impacts (this way of analyzing the management of polluting processes). • Reinforce, analyse and evaluate knowledge of the management of the polluting processes of the different activities. • Guided visits to the mining unit and the paper industry.	evaluation instruments, referred Bibliography.
Module 3	Management Plans.			
Intended learning	**Learning contents**	**Learning product(s)**	**Strategies**	**Teaching resources and materials**

Analyse and apply the knowledge acquired in a practical way studying real cases of the community.	3.1Management Plans based on Pollutant Processes studied in Module 2.	• Development of management plans from a pollutant process studied in module 2, including a diagnosis with a description of the activity being studied, introduction, characterization, legal and regulatory framework in Mexico, activity flow diagram of the activity , generic description of the process, general activities in each stage of the process, identification of impacts and environmental risks, description of measures to be applied in each case, whether mitigation measures, prevention, control and / or compensation. • Final project, Word document of the Management Plans.	• Recapitulate, study understands, analyse, integrate and find practical application to the knowledge acquired in the modules of the learning unit. • Group activity to analyse and discuss management plans.	• Computer, internet, projector, multimedia presentations, reading of documents, videos, evaluation instruments, referred bibliography.

17. Performance assessment:

Performance evidence(s)	Performance criteria	Application scopes	percentage
Research, Exhibition, Conceptual map, Summary, Comparative table, flow diagrams, projects, Essay, Exercises; questions in class, assessment instrument, comparison of self-evaluation and co-evaluation.	**In all the works, content, extension and presentation, use of tools, capability for explanation, analysis, synthesis, understanding and handling of the debate, group defence, team work, delivery opportunity, class participation are valued.**	**In the prevention and reduction of pollution, through studies of natural and anthropic risks, with a precautionary and preventive approach, studies of damages and degrees of risk, vulnerability, danger, environmental and social**	**Module 1:** **Summative evaluation:** **Diagnostic Test (5%)** **Essay "The history of things" (10%)** **Test "Trophic Chains" (5%)** **Exercise definitions "Measures" (5%)** **Conceptual map (20%)** **Knowledge evaluation (30%)** **Evidence Portfolio (10%)**

		risks.	**Formative evaluation:** **Participation (10%)** **Aptitudes and values (5%)** **Total: 100%** **Module 2:** **Summative evaluation:** **Presentation Processes, impacts and measures (20%)** **Flow diagrams of Processes and tables of impacts and measures (40%)** **Test Letters Vs. Whats App (5%)** **Report to Bipappel view (5%)** **Portfolio of Evidence (15%)** **Formative evaluation:** **Participation (10%)** **Aptitudes and values (5%)** **Total: 100%** **Module 3:** **Summative evaluation:** **Management Plan (70%)** **Portfolio of Evidence (15%)** **Formative evaluation:** **Participation (10%) Aptitudes and values (5%)** **Total: 100%** **In the final evaluation of the semester is included in**

			the final grade: **Summary for Self – assessment (10%)** **Issuance of value judgments in** **Co-evaluation (5%) Issuance of value judgments in** **Hetero-evaluation (5%)**

18. Evaluation criteria:

Criterion	Value
Formative Evaluation	**15% participation, skills and values. 10% Self-evaluation, 5 % Hetero evaluation, 5 % Coe evaluation.**
Summative evaluation	**65% the products and activities requested during the course, indicated above.**
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 pass with a minimum of 6.0; the evaluation is done according to the established evaluation criteria. The student who has obtained a minimum final average of 8.5 (eight point five) and 80% attendance, will be exempt from presenting ordinary exam, can present if he wishes, in order to improve their qualification.

20. Information sources

Basic	**- ALFIE MIRIAM (1995). In Search of a Sustainable Development Within the FTA. Ecology and T.L.C. El Cotidiano Magazine.** **BERNARD, J.N, RICHARD T.W.- (1999) Environmental Sciences. Ecology and Sustainable Development. Hall Hispanoamericana, S.A. Sixth edition BIFANI, P. (1984). Development and Environment. MOPU. Madrid.** **BURTON (1968),. The Quality of Environment Review. Geographical Review.** **CAMPBELL, B. (1975). Human Ecology The Position of Man in Nature. Salvat. Barcelona. CAPRA, F. (1994). "The New Ecological Paradigm" New Consciousness No.22.** **WORLD COMMISSION FOR THE ENVIRONMENT AND DEVELOPMENT. (1972). United Nations Declaration on the**

	Human Environment: Proclamations and Principles. Stockholm. **MINISTRY OF ENVIRONMENT. (1995) Environment in Andalusia. Report 1994. Seville Board. Andalusia. EDWARDS, B (2005). Basic guide to sustainability. Editorial Gustavo Gili Barcelona.** **ENKERLIN, E.C, GARZ R.A; VOGEL, E. (1997). Environmental science and sustainable development. Thompson Publishers. Mexico 1997.** **FRIEDRICH EBERT, STIFUNG. Development and Environment in Mexico. Diagnosis 1990. Foundation Universe / Friedrich Ebert, number 9 Mexico 1990.** **GALANO, C. (2005). The Environmental Crisis, Crisis of Humanity. Culture and Science: Ergo Sum Science: Vol. 12 Num. 003. Autonomous University of the State of Mexico** **HERRERA, C. Introduction to the Study of the Environment. Base text for the subject of Environmental Education of the Basic Area of the UJED.** **MONTES C. From sustainable development to ecosystem services. C. Montes. Socio-Ecosystems Laboratory, Department of Ecology, C. Darwin 2, Biology Building, Autonomous University of Madrid, 28049. Madrid, Spain.**
Complementary	**http://thompsonlearning.com.mx** **http://aguamarket.com/diccionario/terms.asp http: // pollution. http://contaminación-ambiente.blogspot.com/ http://enciclopedia.us** **http://gawater.usgs.gov/edu/graphics/watercyclespanishing.** **http://harvey.harker.org/u/harker/amirn/assignments/ozone** **Video: The story of things for Annie.** **Video: Trophic waterfalls.**
21. Profile for the teacher who imparts this learning unit	
University Degree with Master's Degree or PhD in Environmental Management, Environmental Engineering or related area Professional experience in impact studies and environmental risk. Knowledge of environmental education, bioethics, environmental ethics.	