



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		
Investigation methodology			2819		
3. Academic Unit					
Forestry Sciences Faculty					
4. Academic programme			5. Level		
Environmental Management Engineering			Bachelor's degree		
6. Training Area					
Basic					
7. Academy					
Basic and Methodological Sciences Academy					
8. Modality					
Mandatory	X	Course	X	Attendance	X
Elective		Course-workshop		Non-attendance	
		Workshop		Mixed	
		Seminar			
		Laboratory, field practice, etc.			
		Professional Practice			
		Academic Stay			
9. Pre-requirements					
Have passed: Critical and Creative Thinking Skills; Reading and writing.					
10. Theory hours	Practice hours	Independent study hours	Total hours	Credits	
4	0	0	4	4	

11. Names of the teachers who participated in the development and/or modification of the programme		
Dr. Jorge Armando Chávez Simental		
12. Date of development	Date of modification	Date of approval
April 10 th 2013	August 10 th 2015 July 31 th 2017	September 28 th 2015 October 12 th 2017

II. LEARNING UNIT SPECIFIC DATA	
13. Presentation	
<p>The Research Methodology is considered and defined as the discipline that Elaborates, systematizes and evaluates the whole of the procedural technical apparatus available to science, for the search of data and the construction of scientific knowledge. The Methodology consists then in a more or less coherent and rational set of techniques and procedures whose fundamental purpose aims to implement processes of collection, classification and validation of data and experiences from reality, and from which scientific knowledge can be built. The methodology emerges as the sciences develop, from which it follows that the methodological knowledge, learning and experience of the techniques operates as a continuous, gradual and progressive process in which knowledge is built and the way of acquiring it is configured with the passage of experience. The term "scientific research" tends to cause scepticism and confusion in some students; Each student has a different perception of what research is and every day they relate it to highly specialized centres and institutes with national and international renown. Some undergraduate students consider that scientific research is somewhat complicated, very difficult to apply and that requires a special talent. During the course the student will be given the necessary tools, starting from the understanding of the scientific method, characteristics of the research, research process, structure of a protocol, record of sources, search of information and environmental research in Mexico</p>	
14. Integral professional competences to develop in the student	
Generic competences	<ul style="list-style-type: none"> • Instrumental <ul style="list-style-type: none"> • Capability for analysis and synthesis. • Oral and written communication skills. • Knowledge of a foreign language. • Ability to manage information. • Personal <ul style="list-style-type: none"> • Capability for teamwork. • Ethical and quality commitment. • Systemic <ul style="list-style-type: none"> • Motivation for quality. • Ability to apply theoretical knowledge in practice.

	<ul style="list-style-type: none"> • Ability to communicate with people who are not experts in the subject.
Professional competences	<ul style="list-style-type: none"> • Disciplinary <ul style="list-style-type: none"> • Ability to address environmental problems in a multidisciplinary manner. • Ability to integrate experimental evidences with theoretical knowledge. • Qualitative interpretation of data. • Capability for quantitative interpretation of data. • Professionals. <ul style="list-style-type: none"> • Development, management, monitoring and control of environmental projects • Preparation and execution of environmental impact studies.
General purpose of the course	Encourage the student's concern to conduct research where appropriate management, conservation and efficient use of natural resources. This Learning Unit provides skills for the design of experiments, teamwork and reading comprehension as a fundamental activity for all research work. The student will distinguish between empirical and scientific practice.
15. Joint of axes	
Research, Ethics, Values, Environmental education, Languages and disciplinary fields of environmental sciences.	

16. Course development				
Module 1	Knowledge classification			
Intended learning	Learning contents	Learning product(s)	Strategies	Teaching resources and materials
Know the origin and definition of the basic concepts about different types of knowledge in order to induce the student to apply the valid terms in the integration of scientific research protocols related to the area of natural resources management.	Definition and origin of knowledge.	Summary prepared by students about the origin and definition of knowledge.	Reading of the article: Communication and knowledge: Challenges of the digital era. Colle R. 2012	Computer, internet, white-board, marker for white-board, projector, multimedia presentations, referred bibliography.
	Characteristics of knowledge.	Synthesis prepared by the students that contains a conceptual map that includes the main characteristics about the knowledge.	Reading of "Theory of knowledge". From Hessen J.	
	Types of knowledge and their importance in scientific research.	Power Point presentation that defines, describes and exemplifies the different types of knowledge as well as their applicability in scientific research in the area of natural resource management.	Reading and analysis of "Knowledge" by Luque R. J. 1993. And of the article: "Concept, types and dimensions of knowledge: strategic knowledge configuration." By Segarra and Bou, 2005.	

Module 2	Scientific method.			
Intended learning	Learning contents	Learning product(s)	Strategies	Teaching resources and materials
To know scientific research as a systematic process, organized and directed with the purpose of obtaining reliable results obtained from valid procedures and to induce the student in a research process related to the environmental area	Definition and explanation of the scientific method and Phases or stages of the method.	Summary prepared by the students on the definition of the scientific method accompanied by a conceptual map of the phases of the scientific method.	Reading of the following documents: The scientific method and the new philosophy of science, Asensi, 2002; Summary of science its method and its philosophy, Bunge, 2013.	Computer, internet, White-board, marker for white-board, projector, multimedia presentations, referred bibliography.
	Scientific approaches: qualitative, quantitative and mixed	Power Point presentation: Description of the different scientific approaches based on the suggested reading, including an example for each case.	Consultation and analysis of the information presented on the website https://sites.google.com/site/metodologiadelainvestigacionb7/enfoques-quantitativo-y-cualitativo .	
	Characteristics and hypothesis structuring	Presentation in Power Point on the basic aspects for the structuring of a hypothesis.	Reading comprehension of the article: "Formulation of hypothesis" in "Methodology of the investigation" of Hernández-Sampieri, 2003.	
	Important aspects for writing of scientific documents.	Guide on the most important aspects to consider in the writing of scientific documents.	Reading of chapters 1 and 2 of the research methodology book. Sampieri, 1997.	

Module 3	Search and analysis of information			
Intended learning	Learning contents	Learning product(s)	Strategies	Teaching resources and materials
Know the mechanisms for the search of information and its different sources.	Information sources.	Power Point presentation on the development of a systematic literature search to integrate the theoretical framework of the research proposal developed in module 3 (minimum 10 citations from different sources).	Bibliographic consultation at the student's discretion, where it identifies the different bibliographic sources and shows the particularities of each one of them. Recommended: Methodology of research, Sampieri, 1996.	Computer, internet, white-board, marker for white-board, projector, multimedia presentations, referred bibliography.
Identify the types of reliable bibliographic sources and their importance as part of scientific research.	Types and elements of bibliographical references.	Preparation of a Power Point presentation on the elements of the bibliographic citations and examples of the different sources of consultation.	Bibliographic research on the research topic to be developed in the Learning Unit.	
Know and compare the rules and norms to elaborate citations and bibliographical references in different formats.	Rules and norms for the development of citations and bibliographical references.	Delivery of work that describes the different standards for making bibliographic citations.		
Analyse and compare different documents that show research advances in the area of environmental engineering.	Analysis of information for the structuring of research proposals.	Delivery of research proposal.	Consultation, reading and analysis of scientific articles and books on basic and applied science.	

Module 4	Research types.			
Intended learning	Learning contents	Learning product(s)	Strategies	Teaching resources and materials
Identify the differences in the types of research, the importance and the scope of each of them	Basic, applied research and technological development and innovation	Task that shows the requested concepts (minimum 5 bibliographic references for each one)	<ul style="list-style-type: none"> • Consultation with the student's criteria on the concepts of basic and applied research and technological development and innovation • Reading and discussion in class of the scientific article "Basic Science and Applied Science" Perez, 2001. • Round table "Discussion on technology and innovation in Mexico" 	Computer, internet, white-board, marker for white-board, projector, multimedia presentations, referred bibliography
Module 5	Research methods and techniques			
Intended learning	Learning contents	Learning product(s)	Strategies	Teaching resources and materials
Identify the different methods of observation and select the most appropriate research technique for the different types of research projects.	Methods of direct and indirect observation	Synoptic table describing both methods (Minimum 3 bibliographical references). Power Point presentation.	Research on research methods. (The teacher can provide 2 reference bibliographic sources if necessary).	Computer, internet, white-board, marker for white-board, projector, multimedia presentations, referred bibliography
	Techniques: diagnoses, differential, questionnaire, interviews, surveys	Conceptual map of techniques. Include an example of each of the techniques designed by the student. (Minimum 3 bibliographical references) Power Point presentation	Research on the different research techniques.	

Module 6	Investigation project.			
Intended learning	Learning contents	Learning product(s)	Strategies	Teaching resources and materials
Know and apply the techniques for the structuring of dissemination material of research results.	Modalities and characteristics of presentation and publication of research results.	Poster and power point presentation of the research project	Reading of the article "How to present the results of a scientific investigation?" By Manterola, 2007.	Computer, internet, white-board, marker for white-board, projector, multimedia presentations, referred bibliography.
<ul style="list-style-type: none">Integrate a research project that shows the defined sections of the scientific method and present the respective report with the elements in a complete way.Publicize the study in front of the public.	Final presentation of the research project.	Delivery of the complete work on the Research Project.	Reading of the article: "How to prepare the discussion of a scientific article" Eslava 2011.	
17. Performance assessment:				
Performance evidence(s)	Performance criteria	Application scopes		Percentage
<ul style="list-style-type: none">Summary.SynthesisPower Point presentations.Case study.Synoptic table on observation methods.Conceptual map of research techniques.Development of the research proposal.	<ul style="list-style-type: none">Quality (Presentation): Cover, objective of the work, numbering of the page, individual conclusion, bibliography.Congruence (content sequence)Relevance (information regarding the requested topics)	Social, business, governmental sector: local, regional, national and international.		Formative evaluation 40% Summative evaluation 40% Self-evaluation 5% Co-evaluation 5% Heteroevaluation 10%

• Final research work.	• Spelling		
18. Evaluation criteria:			
Criterion	Value		
Formative Evaluation	40% Attendance, values (responsibility, punctuality, respect, ethics, commitment).		
Summative evaluation	40% Delivery of tasks, presentations, exhibition, participation.		
Self-evaluation	5% Evaluation of the student's own performance based on the established criteria		
Co-evaluation	5% Evaluation of peer performance based on established criteria.		
Heteroevaluation	10% Evaluation of student performance by the teacher		
Criteria summation	100% Final qualification of the set of parameters evaluated.		
19. Accreditation			
The accreditation of the learning unit is aligned with the provisions of the regulations of the Forestry Sciences Faculty. The minimum passing grade is 6.0 (six point zero). The student who has obtained a final average higher than 8.5 (eight point five) and 80% attendance, will be exempt from presenting an ordinary exam, however he can present, if he wishes, with the objective of improving his qualification. It is necessary to maintain 80% attendance, otherwise it will go directly to present an extraordinary exam regardless of the final grade obtained.			

20. Information sources	
Basic	<ol style="list-style-type: none"> 1. Alvarado L. J., 2000, Drafting and Preparation of the Scientific Article. Postgraduate School. Agro-science Mexico. 2. Alvarado L., J. 2009. Writing and preparation of the scientific article. 3a. ed. College of Postgraduates. 3. Montecillo, México. 4. American Psychological Association. (2012). American Psychological Association. 5. American Psychological Association. (2012). APA Sytle. 6. Arana F., Experimental Method for Beginners. Ed. Joaquín Mortriz. Mexico. 7. Asensi A.V. and Parra P.A., 2002, The scientific method and the new philosophy of science. Rev. Cient. Network From Latin America, the Caribbean, Spain and Portugal. 5: 9-19. 8. Bear .R. D. 2008. Research Methodology. Editorial Shalom 2008.

9. Bunge M. Science your method and your philosophy.
10. Cely G. G. 2013. Bioethics in the knowledge society. Santafé de Bogotá, Colombia. 3R editors.
11. Colle R. 2012. Communication and knowledge: Challenges of the digital era. Mediterranean Communication Magazine, Alicante, Spain.
12. De la Torre-Villar E. and Navarro de Anda R., 2003, Bibliographic, Archival and Documentary Research, His Method. NAM. Mexico.
13. Díaz San Juan L., 2011. The observation, Faculty of Psychology of the UNAM.
14. Díaz-Barriga M.R., 2001, Technical Writing. IPN. Mexico.
15. Escalera, M. (2011) preparation of Bibliographies according to the Manual of Style of the American Psychological Association (APA).
16. Fernández Menéndez, M. (s.f.). The importance of bibliographical references and citations in the preparation of scientific and / or academic papers and documents.
17. Hernández Sampieri R.H., Fernández Collado C. and Baptista Lucio P., 1997, Methodology of research, Mc. Graw Hill, Colombia. ISBN 968-422-931-3.
18. Hernández-Sampieri C., 2003, Research Methodology. 3rd Edition. Mc Graw-Hill
19. Hessen J. (s / f). Theory of knowledge Latin American Institute of Sciences and Arts.
20. Laso E., Science and the social imaginary: The classification of science and its relationship with technology, Ed. Byblos. Pp. 2942.
21. Luque R. J. 1993. Knowledge. University of Seville, Spain. Department of Electronic Technology.
22. Manterola D.C., Pineda N.V. and Vial G.M., 2007, How to present the results of a scientific investigation, Rev. Chilena de cirugía, 59 (2): 156-160.
23. Manual of Publications of the American Psychological Association, 2010, Ed. The Modern Manual, & ed. Mexico.
24. Martin G.M.A. and Valdés H.L.A. 2003, Innovation and technological development as a State policy and fiscal stimuli to promote it, Rev. Accounting and Administration, 208: 5-36.
25. Naumis Peña C., 2008, Bibliographic record and bibliographic reference: a conceptual review. Rev. Interamericana de Bibliotecología, 31 (1): 227-245.
26. Pérez Tamayo R. 2001, Basic Science and Applied Science, Network of Rev. Cient. From Latin America, the Caribbean, Spain and Portugal, 43 (4): 367-372.
27. Pontificia Universidad Católica de Chile. Effective search tutorial: Cite the documents.
28. Segarra C. M., Bou L. J. C. 2005. Concept, types and dimensions of knowledge: configuration of strategic knowledge. Journal of Economics and Business No. 52 and 53.

	<p>29. Slava Schmalbalch J. and Pablo Alzate J., 2011, How to Elaborate the discussion of a scientific article, Rev. Col. Or. Tra., 25(1): 14-17.</p> <p>30. Torres S., González B. A. and Vavilova I. 2013. The citation and the bibliographic reference: guide based on APA standards. 3rd edition, revision and expansion. UCES Central Library, Buenos Aires, Argentina.</p> <p>31. Zavala Trías, S. (2012). Guide to writing in the APA style 6th edition</p>
Complementary	<p>1. Guide for the production of citations and bibliographical references, according to the Vancouver style. 2011. Central Library. Technical Processes Area. University of Piura. Piura Peru.</p> <p>2. Chicago Referencing Style. 2013. University College Dublin Library. Dublin, Ireland</p> <p>3. Cerejido, M. 1997. Why do not we have Science? Twenty-First Century Publishers.</p> <p>4. Kerlinger, F. 2002. Behavioural Research. Editorial Mc Graw-Hill.</p>
21. Profile for the teacher who imparts this learning unit	
<ul style="list-style-type: none"> • University Degree with Master's or Doctorate. • Professional university experience as a professor in the area. • Teaching experience with the management of the chair with large groups of students. • Research experience. • With experience in learning by competences, with a proactive attitude, software management for data analysis. 	