Basic Sciences

Division

Department of Chemistry

Follow up Modular Workshop

CUCEI

UNIVERSIDAD DE GUADALAJARA
CENTRO UNIVERSITARIO DE CIENCIAS EXACTAS E INGENIERÍAS

1.- GENERAL INFORMATION				
Learning unit: Follow up Modular Workshop I		**Department:** Chemistry		**Course format** Lecture
Prerequisites (P) None	**Corequisites (CO)** None	**Ascribed Academy** Chemistry	**Module** M1: Structure of Matter	
Type Modular project	**Theory Hours** 2 hrs. per week	**Practice Hours** 0 hrs.	**Total hours** 34 hours	**Credits** 2
Degrees in which this class is taught: B.S in Chemistry.				

2.- GENERIC COMPETENCIES

Students…
- Interpret and explain the phenomena of their reality from scientific methodology.
- Search and classify the different types of research in the scientific and technological field inside and outside school.
- Presents a research draft related to the area of chemistry.
- Develop protocol elements on a structured document.
- Present the research protocol orally and in writing.

Specific competencies:

-Synthesis, abstraction and analysis.
-Computer and communication skills
-Problem identification
-research abilities
-Application of knowledge to practical knowledge
-Oral and written production
-Team work
-Critical approach to self and others
-Ethical commitment.

3.- SPECIFIC CHARACTERISTICS OF THE COMPETENCIES	
Knowledge	Students: ▪ Understand the importance of criteria and elements that make up successful research. ▪ Have a critical view on the choosing of a research method. ▪ Have a general scope of the different research methods. ▪ Know about the relationships between a research topic, its theory and the possible solution method to use.

	▪ Are able to design a research proposal with enough background support in order to be approved.
Skills	• Apply research strategies to propose solutions to problems. • Identify, contextualize and propose real solutions and well supported to problems detected in the professional field. • Present the research projects they carry out both in writing and orally. • Find and retrieve the required literature in order to do their research project. • Systematize the scientific bibliographic information related to their research project.
Aptitudes	• …identify and solve problems through the formulation of hypotheses and the application of the necessary principles in an analytical and synthetic way. • … relate different knowledge of different fields and apply it in professional and ordinary situations. • …develop study habits and manage their own learning. • …find solutions to specific theoretical or practical problems where they apply the knowledge they learned.
Values	…develop and exercise values such as responsibility, honesty, tolerance, respect, solidarity, willingness and positive attitude towards individual and group work.

4.- TRANSVERSAL COMPETENCIES

☐	Foreign Language (English)
☑	Critical, analytical and synthetic thinking. a
☑	Oral and written expression
☑	Professional ethics
☐	Administration of human and material resources
☐	Leadership and sustainability
☑	Creativity, innovation and entrepreneurship
☐	Other

5.- COURSE CONTENT OF THE LEARNING UNIT

1. Fundamentals of research
1.1 Science and knowledge
1.2 The goals of science
1.3 Classification of sciences
1.4 Types of knowledge
1.5 The scientific method
1.6 The research process

2 Writing a research protocol
2.1 Stating the problem
2.1.1 Formulating the problem
2.1.2 Narrowing the problem
2.2 Formulating hypotheses
2.2.1 Types of hypotheses
2.2.2 Writing up a hypothesis

2.3 Formulation of objectives
2.3.1 General objectives
2.3.2 Specific objectives

2.4 Justification
2.4.1 Stating the justification
2.4.2 Viability of the investigation

2.5 Designing the theoretical framework
2.5.1 Background Research
2.5.1.1 Theoretical bases
2.5.1.2 Definition of basic terms

2.6 Literature review
2.6.1.1 Guidelines to use textual citations and references
2.6.1.2 Guidelines to present the list of references

3 Structure of the research protocol
3.1 Protocol structure
3.1.1 Parts of the project

- Cover page
- Index
- Introduction
- Background (literature review)
- Hypothesis
- General objective and specific objectives

3.2 Presentation of the research proposal: oral and written.
3.3 Evaluation of the protocol according to the grading criteria.

6.- ASSESSMENT	
☑	Numeric grade

7.- GRADING CRITERIA OF THE LEARNING UNIT	
Indicator of evaluation	**Percentage**
Departmental exams	30
Partial exam	0
Homework	20
Research activities	0
Practice reports	0
Class participation	10
Investigation Project	40

8.- REQUIRED MATERIAL (for students)	
☐	Logbook
☐	Articles and research report

9.-SPECIFIC CONTENT BY LEARNING UNITS						
Content unit	**Generic competency of the content unit**	**Topics**	**Class hours**	**Professor activities**	**Student activities**	**Bibliography**
Unit 1 Fundamentals of research	Students search and classify the different types of research in the scientific and technologic field. Review the stages in the research process to understand research as a constructions process.	1.1 Science and knowledge	30 min	Professor… -guides the students into the subject by brainstorming the concepts of science and knowledge. -Teaches and defines the concepts of science and its classification. -Teaches the different types of knowledge.	Students… -Play an essential role by finding information and discussing the different concepts stated by the professor. -Respond exercises and do homework of the content unit.	García De Alba, Pompeya. (2000). *Metodología de la Investigación*. Mexico: Porrúa.
		1.2 The goals of science	30 min			
		1.3 Classification of science	1 h			
		1.4 Types of knowledge	30 min			
		1.6 The research process	1 h			

		1.7 The scientific method	2 h	-Guides students to apply the acquired knowledge a tool to solve problems in different areas.		
Unit 2 Writing a research protocol	Students are able to identify, state, and solve problems. Students develop reading comprehension abilities and management abilities to look for scientific bibliographic information.	2.1 Stating the problem		Professor… -Teaches the concepts and definitions of the research process. -Visits the labs where the research is taking place. -Designs and assigns homework that promote feedback of the	Students… -Do homework of the unit concepts. -Play an essential role by finding information and discussing the different concepts stated by the professor -Present their research	García De Alba, Pompeya. (2000). *Metodología de la Investigación.* Mexico: Porrúa. Hernández, R. (2007). *Fundamentos de metodología de la investigación.* Madrid, Spain: McGraw-Hill. Ocegueda Mercado, Corina. (2007). *Metodología de la*
		2.1.1 Formulating the problem.	2 h			
		2.1.2 Narrowing the problem.	2 h			
		2.1 Formulating hypotheses				
		2.2.1 Types of hypotheses	2 h			
		2.2.2 Writing up a hypothesis	2 h			
		2.3 Formulation of objectives				

	Students are able to identify, state and solve problems. Students develop reading comprehension abilities and management abilities to look for scientific bibliographic information.	2.3.1. General objectives	3 h	topics seen in class.	proposal and discuss about it.	*Investigación, Métodos, técnicas y estructuración de trabajos académicos.* Ortiz Uribe Frida G y García María del Pilar. (2000). *Metodología de la Investigación. El proceso y sus etapas*. México: Limusa
		2.3.2 Specific objectives	2 h			
		2.4 Justification				
		2.4.1 Stating the justification	1 h			
		2.4.2 Viability of the investigation	2 h			
		2.5 Theoretical framework				
		2.5.1 Research background	30 min			
		2.5.1.1 Theoretical bases	30 min			
		2.5.1.2 Definition of basic terms				
		2.6 Literature review 2.6.1.1 Guidelines to use textual citations and references	30 min			

		2.6.1.2 Guidelines to present the list of references	1 h			
Unit 3 Structure of the research protocol	Students are able to identify, state and solve problems. Students develop reading comprehension abilities and management abilities to look for scientific bibliographic information. Students present their research projects orally and in writing.	3.1 Protocol structure 3.1.1 Parts of the project ▪ Cover page ▪ Index ▪ Introduction ▪ Background (literature review) ▪ Hypothesis ▪ General objective and specific objectives	3 h	Professor… Teaches the concepts and components of a research protocol. Guides students to design their research topic by applying the knowledge seen in class. -Designs and assigns homework that promote feedback of the	Students… -Play an essential role by finding information and discussing the different concepts stated by the professor -Do homework of the unit concepts. -Solve some exercises on the topic. -Search, organize, and synthesize	Schmelkes, Corina. (2004). *Manual para la Presentación de Anteproyectos e Informes de Investigación (Tesis*). Oxford. Taborga, H. (1982). *Cómo hacer una tesis*. Mexico: Grijalbo. Tramullas, J. S. *Tendencias de Investigación en Documentación*. Madrid, Spain: Librería General.
		3.2 Presentation of the research proposal: orally and in writing.	5 h			

		3.3 Evaluation of the protocol according to the grading criteria.	1 h	topics seen in class.	information in order to present their research topic in a structured way.	

COURSE EVIDENCE
(Deliverables)

- **Departmental exam**
- **Research homework**
- **Research project**

10.-PROFESSOR'S PROFILE

Professionals in the different fields of chemistry, with experience in developing research projects and using electronic databases to search for bibliographic information. Knowledge of didactic methodologies.

11.-AUTHOR OF THE LEARNING UNIT

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12.-MODIFICATION AND UPDATE

October 10, 2016