

**Sistema de Administración de Calidad**

	<i>Clave</i>	<i>Nombre</i>	<i>Revisión</i>	<i>Hoja</i>
	R-03-SAP	<b>Programa Sintético</b>	00-06/17	1de1

<b>Área Curricular</b>	Básica		
<b>Campo Disciplinar</b>	Ciencias Experimentales		
<b>Unidad de Aprendizaje</b>	Temas Selectos de Química	<b>Semestre</b>	4to
<b>Periodo Académico</b>	Enero-Junio 2020		
<b>Coordinador de Cuerpo colegiado:</b>	Dra. Jannet Edith Salinas Hernández		

**PURPOSE:** The Chemistry Selected Topics unit learning, it is present in an important change for the UANL High Medium Level, according to the new academic model centered in the student learning. The intention is continuing the integral student formation, promoting the self-learning, the collaborative work, the technology uses to get information, the reflexive and critic thinking, decision take, for the propoitive roll that let him interact in plural contexts in the search of the common-weal participating actively in the country sustainable development.

We considered that Chemistry Selected Topics contain topics that are not included in the regular courses or that were included but with no much depth required for the students that are interested in the science, due to its desire to study a career that deals with or just for curiosity.

These learning units is choice free and contribute to strengthen the competence in the propaedeutic area, as well as the Physics, Biology, Math, Social Sciences, Communication and language.

The three units of this course contribute to a scientific culture trough the students can take fundamental decisions for the evaluations of risks and benefits of the science and technology. In each topic we will tackle theoretical contents, as well as problems whose resolutions contribute to the thinking skills development. In this way, lab practices will be useful for the student to apply the theoretical knowledge acquired to solve daily problems.

The evaluation process in this learning unit is continued and formative and integrates the fourth attributes of a competence: knowledge, skills, attitude and values, using methods and resources as: projects, debates, study cases, problems based in analysis (PBA), exams and portfolio.

**GENERAL COMPETENCES:**

- Choose and practice healthy lifestyle
- Listen, interpret, and send messages in different contexts by means of methods, codes and suitable tools.
- Develop innovations and suggest solutions to problems through established

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methods.

- Maintain a personal stance about interested and general relevant topics considering others points of view of a critical and reflexive way.
- Learn by its own interest and initiative through the life.
- Participate and collaborate in an effective manner in different teams.
- Participate with a civic and ethic consciousness in its community, region of Mexico and the world.
- Contribute to the sustainable development of a critical way with responsible actions.

### DISCIPLINARY COMPETENCES:

- Fundament opinions over how the science and technology impacts its life.
- Identify problems, formulate scientific questions and postulate necessary hypothesis to answer its.
- Obtain, register and systematize the information to answer scientific questions, searching information in scientific journals and performance experiments.
- Contrast the obtained results in a research or experiment with previous hypothesis and communicate its conclusions.
- Explain the scientific knowledge that support the process to solve daily problems.
- Apply security rules in the manage of lab substances, instruments and equipment.

### CONTENT:

#### **Stage 1: Hydrocarbons derivatives in organic compounds of importance**

Formative goal: Identify and classify hydrocarbons derivatives by their functional groups and properties, to understand their use and importance at the industrial and biological level.

General objectives:

- To identify functional group
- To classify hydrocarbon derivatives
- To appreciate the biological and industrial importance of hydrocarbon derivatives.

#### **Topics**

1.1 Introduction

1.2 Hydrocarbon derivatives: main functional groups

1.3 Biological and industrial importance of hydrocarbon derivatives.

#### **Stage 2: Nanotechnology and new materials**

Formative goal: Examines the principles on which nanotechnology is based, through the study of allotropic forms of carbon, to understand its application in new materials, as well as the benefits and risks of its use.

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General objectives:

- To identify the characteristics of nanomaterials.
- To choose relevant sources of information in a research area.
- To analyze and exemplify the applications, benefits and risks of nanotechnology.

**Topics**

- 2.1 Nanotechnology: Science at the nanoscale
- 2.2 History of Nanotechnology
- 2.3 Chemical elements in Nanotechnology
- 2.4 Allotropic forms of carbons
- 2.5 Characteristics of nanomaterials
- 2.6 Applications of nanotechnology
- 2.7 Classification of nanomaterials
- 2.8 Benefits and risks of its applications

**Stage 3: Applications of the Oxidation-Reduction Process**

Formative goal: Uses the oxidation-reduction process (redox) through its symbolic representation, to analyze and understand some biological and industrial application in everyday life.

General objectives:

- To identify an oxidation -reduction equation
- To explain the concepts of oxidation and reduction, oxidizing agent and reducing agent, based on electron transfer.
- To identify oxidizing and reducing agents in the redox reactions, based on changes in the oxidation numbers.
- To balance chemical equations by the method of the change in the oxidation number.
- To describe the main components of the voltaic and electrolytic cells, their operation and the essential difference between them using the basic concepts of oxidation-reduction.
- To describe what the electroplating and corrosion processes consists of, applying basic electrochemical concepts.

**Topics**

- 3.1 Introduction
- 3.2 Oxidation -reduction concept
- 3.3 Concepts of oxidizing agent and reducing agent
- 3.4 Oxidation number
- 3.5 Identification of oxidation-reduction using oxidation numbers
- 3.6 Balancing oxidation-reduction reactions
- 3.7 Electric energy and oxidation-reduction
- 3.8 Application of electrochemical reactions

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**Stage 4:** Gases : their laws and behavior

Formative goal: Apply the principles and laws that govern the behavior of gases in problems solving, to understand and reflect on their importance to life and the environment.

General objectives:

- To describe the properties and variables that govern the behavior of gases.
- To solve problems by applying the laws of gases.
- To analyze the behavior of gases in three processes of daily life.

**EVALUATION:**

EVIDENCES	PONDERATION
Portfolio 1	7%
Portfolio 2	7%
Portfolio 3	7%
Portfolio 4	7%
Partial Exam	10%
Mid-term	15%
Internal Global Exam	10%
Global Exam	25%
Multidisciplinary Project / Integrative activities. (PIA)	12%
<b>TOTAL</b>	<b>100</b>

**Notes**

\* Grades of portfolios 2 and 4 will be affected in case of failing exams (portfolio 1 - 1st partial, Portfolio 3 – intern global).

\*In case of failing the course, the student must have at least the 70% of the portfolio points in order to have right to the 2nd opportunity exam.

\* If a student does not upload to NEXUS an activity of learning evidence, besides the zero in the activity, one point will be discount of the final score per each activity that is not in NEXUS.

**BIBLIOGRAPHY:**

Basic:

Morales Pinal, Mosiváis Lara, Rodríguez Herrera, Salinas Hernández. Selected Topics of Chemistry, PATRIA educación, 2020, primera edición.

Complementary:

Karen C. Timberlake General, Organic, and Biological Chemistry Structure Pearson 6th Edition

Nivaldo Tro. Química. Una visión molecular del mundo CENGAGE Learning, 2011, cuarta edición.

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**Web sites support:****- Stage 1 Organic Chemistry**

<http://www.chemhelper.com/practicetests.html>

[https://saylordotorg.github.io/text\\_the-basics-of-general-organic-and-biological-chemistry/index.html](https://saylordotorg.github.io/text_the-basics-of-general-organic-and-biological-chemistry/index.html)

**- Stage 2 Nanotechnology**

<http://nanopinion.archiv.zsi.at/en/about-nano.html>

<http://vlab.ntse-nanotech.eu/NanoVirtualLab/>

**- Stage 3 Redox reactions**

<http://www.chemistry.wustl.edu/~coursedev/Online%20tutorials/Plink/Redox/redoxset.htm>

<http://es.slideshare.net/sureshss141/redox-reactions-exercise-with-solutions>

<https://www.wisc-online.com/learn/natural-science/chemistry/gch7804/balancing-oxidation-reduction-equations>

<http://www2.southeastern.edu/Academics/Faculty/wparkinson/help/electrochemistry/test.html>

[http://chemwiki.ucdavis.edu/Analytical\\_Chemistry/Electrochemistry/Electrolytic\\_Cells](http://chemwiki.ucdavis.edu/Analytical_Chemistry/Electrochemistry/Electrolytic_Cells)

**- Stage 4 Gases**

<http://www.proprofs.com/quiz-school/story.php?title=gas-laws-review-quiz-20-items>

<http://www.onlinemathlearning.com/gas-laws-chemistry.html>

<http://www.sparknotes.com/testprep/books/sat2/physics/chapter12section2.rhtml>