



**UNIVERSIDAD LIBRE®**

Personería Jurídica No. 192 de 1946 de Mingobierno  
Nit.: 860.013.798-5



## FREE UNIVERSITY PEREIRA SECTION

### UNDERGRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING



**SUBJECT:** CHEMISTRY III AND LABORATORY

**CODE:** -----

**SEMESTER:** THIRD

**HOURS** WEEKLY: 6

THEORETICAL: 4

PRACTICES: 2

**REQUIREMENTS:** CHEMISTRY II,

CALCULUS II,

PHYSICS I AND LABORATORY -

LINEAR ALGEBRA

#### GOALS.

Study the sources, reactions, transport and effects of chemical variables in the air

Study the physicochemical characteristics of the atmosphere and the reactions that occur in it  
she





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## METHODOLOGY.

The course will be developed with master lectures by the professor on the content basics of the subject; for their part, students will strengthen their knowledge of the subject through recommended readings, consultations with the teacher and the development of problems of application. For laboratory practices, the teacher will briefly illustrate the content and purpose of the same and its relation to the topic seen; then the Students will proceed to carry out the practice and their respective report.



## WORK PROGRAM.

- ENVIRONMENTAL LEGISLATION IN COLOMBIA VENEZUELA
- Law 99 and decrees 02/82 and 948/95
- The Venezuelan Environmental Criminal Law and its regulatory decrees

## STRUCTURE OF THE ATMOSPHERE

- Oxygen
- ÿ Nitrogen
- ÿ Carbon-hydrogen-oxygen cycle





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- positive ion cycle

- negative ion cycle

#### ATMOSPHERIC POLLUTANTS

ÿ CO and CO<sub>2</sub>

- Hydrocarbons

ÿ Nitrogen oxides

ÿ Oxidants

ÿ Halogenated compounds

ÿ Sulfur compounds

ÿ Particulate matter

#### PHOTOCHEMICAL REACTIONS IN THE ATMOSPHERE

ÿ Photochemical processes

ÿ Chemistry of the conversion of NO to NO<sub>2</sub>

ÿ Ozone Reactions

ÿ Sulfur photolysis

ÿ Photochemical smog

ÿ Hydroxyl and hydroxyperoxyl radicals

#### Environmental CHEMISTRY of hazardous waste

- Origin





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- Transportation

- Effects

ÿ Hazardous waste in the geosphere

ÿ Hazardous waste in the hydrosphere

ÿ Hazardous waste in the atmosphere

ÿ Hazardous waste in the biosphere



#### LITERATURE.

HEICKLEN JULIAN, Atmospheric Chemistry

WARK K., WARNER CF, Air Pollution, Origin and Control, LIMUSA, Noriega

Editors

SAWYER & McCARTY, Chemistry for Environmental Engineering, McGraw Hill, Inc. New York, 1978

PRESIDENCY OF THE REPUBLIC OF COLOMBIA, Decree 948 of 1995

ALMA FOUNDATION, Health Provisions on Air Pollution, Decree 02 of 1982, Decree 2206 of 1983





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MEIER HENRIQUE, Institutions for the Protection of Renewable Resources in Our Country

Law, 1974

Meier Henrique, Administrative Law and the Protection of the Physical and Social Environment

in Venezuela (Natural and Human Environment) (Law and Ecology)

MARNR, Environmental Criminal Law and its Technical Standards, MARNR, Imago, Caracas, 1992



 **CAMINANDO EN LA EXCELENCIA**

