



**UNIVERSIDAD LIBRE®**

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



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**FREE UNIVERSITY PEREIRA SECTION**

**UNDERGRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING**



**SUBJECT:** TREATMENT PLANTS I

**CODE:** -----

**SEMESTER:** EIGHTH

**HOURS** WEEKLY: 6

THEORETICAL: 4

PRACTICES: 2

**REQUIREMENTS:** HYDRAULICS II,  
ANALYSIS OF UNIT PROCESSES II

**GOALS.**

- That the student knows the environmental legislation and in particular that pertinent to the use of water resource.
- That the student acquires the ability to evaluate an industrial process and propose solutions associated with the rationalization of inputs and discharge controls, through the application of knowledge of unit operations and processes.





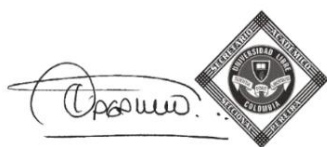
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## METHODOLOGY.

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 professor, visits to industries and through the development of a project that will be carried out during the semester.



## WORK PROGRAM.

### 1. THE PROBLEM OF INDUSTRIAL POLLUTION

- Uses of water in industry
- Industry and pollution
- control at the industry level
- Pollution parameters and their health significance, associated with types of industries.

### 2. LEGISLATIVE ASPECTS.

- Background: Decree 1371/53, Law 09/79





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- Validity of regulatory decrees 1594/84 and 2105 of 1983

- Law 99 of 1993

### **3. INDUSTRIAL LIQUID WASTE CONTROL PROGRAM**

- Elements of a control program
- Flow measurement
- Sampling
- Data analysis and interpretation

### **4. GENERAL APPROACHES TO LIQUID WASTE TREATMENT**

#### **INDUSTRIAL**

### **5. OPERATIONS FOR REMOVING LARGE SOLIDS**

### **6. OPERATIONS USED AS PRETREATMENT**

### **7. INDUSTRIAL WASTEWATER. CHARACTERISTICS AND TREATMENT**

- Food industries
- Tanneries
- Oil
- Chemical industries
- Steel industry
- Electroplating





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## LITERATURE.

CONGRESS OF THE REPUBLIC OF COLOMBIA, Environmental Law. Law 99 of 22  
December 1993, CORPONOR

ORTEGA TORRES JORGE, National Code of Renewable Natural Resources and  
Environmental Protection, TEMIS Publishing House, Bogotá, 1986

METCALF & EDDY, Sanitary Engineering, Water Treatment, Disposal and Reuse  
residuals

NEMEROV N., Industrial Water Pollution origins, characteristics and treatments

ACODAL, VALLE DE CAUCA, Characterization of Industrial Wastewater reports  
of the course

CLESCERY LS, GREENBERG AE, TRUSSEL R., Standard Methods for the  
Examination of Water and Wastewater, APHA





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CAR, Instructions for liquid gauges

EPA, Handbook for Monitoring Industrial Wastewater, US Environmental Protection

Agency, Technology Transfer

