FREE UNIVERSITY PEREIRA SECTION

UNDERGRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING

SUBJECT: PHYSICS II AND LABORATORY

CODE ----------

SEMESTER THIRD

HOURS WEEKLY: 6

THEORETICAL: 4

PRACTICES: 2

PREREQUISITES: PHYSICS I AND LABORATORY -

CALCULUS II,

LINEAR ALGEBRA

CO-REQUISITES:

GOALS:

To enable the student to understand and apply the scientific principles of elasticity and of fluid mechanics, quantifying its properties and understanding the mechanisms of heat transmission and preparing you to understand the principles of optics geometric.

Develop the investigative character in students through experimental methods

in the laboratory.

METHODOLOGY:

Master lectures by the professor accompanied by ongoing practices in the

laboratory of related and theoretically explained experiments. Active participation

of the student must be achieved with methodologies that induce him to participate such as

constant questions, individual and group research work. The practices

Laboratory sessions should be, as their name suggests, practical, with active participation of the

students, motivating their attitude towards research and the demonstration of

natural phenomena.

CONTENT :

ÿ Elasticity and Plasticity: stress, deformation, plasticity and stress classes.

ÿ Elasticity of fluids: elasticity, pressure, density. Pumps, let's handle them.

Archimedes' and Pascual's principles. Pressure variation. Buoyancy

ÿ Fluid dynamics: Flow line and current. Conservation equation in Mass and energy. Applications of Bernoulli. Tubes, venturi. Pressure gauges and flow.

ÿ Temperature and thermal expansion: Temperature and expansion, thermometers, scales ordinary and absolute, coefficient of expansion. Linear, superficial and volumetric.

ÿ Calorimetry: quantity of heat, transmission energy, color capacity. Relationship between specific heat and temperature. Coefficients, cooling curves and heating.

ÿ Heat transfer: Conduction, plates, cylinders, spheres, areas and measurements equivalents, radiation, perfect black, heat conduction problems, Thermal properties of matter

ÿ Geometric optics: nature of light, electromagnetic effect, rays, sources of Waves, reflection and refraction. Huggens' principle, dispersion, lenses, and instruments opticians, magnifying glasses, converging and diverging lenses, cameras, projectors, microphones and telescopes.

LABORATORY PRACTICES

1. Videos about pulleys, machines and properties of matter
2. Errors in the measurement of experimental measurements.

3. Pulleys

4. Parallel forces and moment. Concurrent forces

5. Static equilibrium of a rigid body

6. Static balance according to the ladder model.

7. Balance Model

8. Three-dimensional static equilibrium

9. Simple pendulum, Compound pendulum

10. Newton's Second Law

BIBLIOGRAPHY:

RESNIK and HOLLIDAY. Physics for Science and Engineering Students.

Zears and Zemansky. General Physics. Educational Ed.

STREETER W. Fluid Mechanics. Ed. McGraw Hill

BUECHE. Physics for Science and Engineering Students. Ed. McGraw Hill