

Environmental Engineering Lab

Purpose

Introduce the student to the principles of environmental engineering, including topics like environmental chemistry, materials and energy balances, water quality management, water treatment, and wastewater treatment. The objective of this lab for the students is to be able to apply mass balance, chemical kinetics, and other empirical concepts and techniques in developing basic treatment schemes. Understand the relevance of concepts in general and physical chemistry in determining the quality and treatment options for water supplies, and wastewater. Identify, recognize, analyze and comprehend wastewater problems, and the engineering principles behind the major unit operations employed for wastewater treatment.

Equipment

1. Drying Oven
2. Refrigerator
3. Water Baths
4. Microscope
5. UV-Vis Spectrophotometer
6. Analytical Balance
7. Atomic absorption spectrometer (AAS)
8. Gas Chromatograph
9. High Performance Liquid Chromatograph (HPLC)
10. Total Organic Carbon Analyzer (TOC)
11. Incubator – Upright
12. Water Still
13. Nessler Tube System
14. Turbidity Meter
15. Muffle Furnace
16. Filter Photometer/Colorimeter
17. Flame Photometer
18. Autoclave - Bench Top
19. Colony Counter - Darkfield Quebec type
20. Membrane Filter Apparatus, filter holders
21. Deionizer
22. Flocculation test unit (JAR TEST)
23. Kjeldhal Distillation
24. BOD Refrigerator/Incubator
25. Centrifuge
26. Air Compressor Supply
27. COD Reactor
28. CO Analyzer



Geotechnical Engineering Lab

Purpose

The Geotechnical Engineering lab teaches the use of natural material such as soil and rock in combination with engineered material such as concrete, steel and geosynthetics, in the design of dams, tunnels, on-shore and off-shore reclamation for airports, landfills, deep excavations, and foundations for structures of all kinds. The students perform tests for soil samples following properties Index and classification of soil, soil stresses, soil compaction, consolidation and consolidation settlement, shear strength of soils.

Equipment

1. Slake durability device
2. Bench-mounting mixer
3. Soil Hydrometer ASTM (151 H)
4. Mechanical analysis stirrer
5. Proctor Compaction Rammer, 5.5 lb
6. ASTM Compaction Mould
7. Sand cone density test
8. Vibrating Table
9. Dynamic cone penetrometer
10. Automatic Compactor
11. Consolidation Apparatus
12. Constant Head Permeability Apparatus
13. Sample Extruder
14. Triaxial Test Device
15. Direct shear device
16. Plate bearing test equipment
17. Core drill
18. Core Trimmer and cutting machine
19. Masonry Saw
20. Digital point load test device
21. Falling head permeability Apparatus
22. Unconfined compression machine
23. Portable rock shear box device
24. Sieve shakers
25. Vernier Callipers
26. De-airng Pump



Highway Engineering Lab

Purpose

Introduction to Performance Grade (PG) specifications and SuperPave mix design, hands-on testing on SuperPave equipment, determination of the rheological properties of Bitumen using SuperPave equipment, Evaluation of Hot Mix Asphalt (HMA) using SuperPave equipment. The objective of this lab is for the students to understand Performance Grade (PG) specification of asphalt and the SUPERPAVE mix design process.

Equipment

1. Servopac Superpave Gyrotory Compactors with extra molds
2. Asphalt Pavement Analyzer – APA
3. Brookfield Rotational Viscometer (RV)
4. Dynamic Shear Rheometer (DSR) Spindles 25mm and 8mm
5. Asphalt Pressure Aging Vessel (PAV)
6. Bending Beam Rheometer (BBR)
7. Direct Tension Tester (DTT)
8. Bench Mounting Mixers (5 liter nominal Capacity)
9. Vacuum Pycnometer (6000 g)
10. Rice Test Vibrator
11. CoreLok Density Measurement Device
12. Asphalt Material Performance Tester (SPT)
13. NCAT Binder Ignition Oven
14. Friction Tester
15. Digital Laboratory CBR Test Machine
16. Large Capacity Oven (>425 liters)
17. Buoyancy Balance (15kgx0.1g)
18. Automated Core Trimmer/Cut-off Machine (Wet Saw)
19. Cleveland Flash Cup Apparatus
20. Rolling Thin Film Oven (RTFO)
21. Servo Hydraulic UTM-130



GPS & Surveying Lab

Purpose

In Surveying Laboratory Students, apply the fundamentals of surveying to field exercises using modern surveying equipment (digital level, laser level, theodolite, total station and GPS). Field exercises include leveling, topographic mapping, Distance, angular measurement, and areas calculation.

Equipment

1. Total Station
2. Digital Theodolite
3. Digital Level Sprinter
4. Digital Planometer
5. Laser distance measuring device
6. Measuring Wheel
7. Laser Level
8. GPS



Construction Materials Lab

Purpose

Civil engineers are often responsible for specifying, designing and manufacturing the materials with which they build their structures. Studies in construction materials are intended to make structural, transportation and foundation engineers aware of the fundamental properties of the materials they use. This lab provides civil engineering students fundamental principles of the behavior, physical and engineering properties of various common civil engineering materials, including, sands, aggregates, cement, and concrete. Selection and design of materials based on their intended use in design and construction are emphasized. The laboratory is designed to provide students a hand-on experience on concrete mix design, which includes proportioning, mixing, casting, and concrete testing concepts and procedures.

Equipment

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| 1. Air Entrainment Meter, 5 Liters | 11. Poker Vibrator |
| 2. Table Vibrator, 600 × 400 mm | 12. Flexural / Tensile Testing Machine |
| 3. Specific Gravity Frame | 13. Compression Machine |
| 4. High Performance Ultrasonic Tester | 14. Flexural Beam Frame |
| 5. VICAT Apparatus | 15. Concrete Test Hammer |
| 6. Vebe Consistometer | 16. Drying Oven |
| 7. Compacting Fracture Apparatus | 17. Digital Platform Scale 60 Kg |
| 8. Motorized Sieve Shaker | 18. Digital Balance 6 Kg |
| 9. LA Abrasion Machine | 19. Digital Balance 30 Kg |
| 10. Concrete Mixer | |

