Laboratory Facilities @ AIIE

Civil & Infrastructure Engineering (CIE) Department

AIIE has well established laboratories in Civil and Infrastructure Engineering department in which various basic and advanced Tests/Experiments can be performed with high level of accuracy.

1. **Materials Testing Laboratory:**
   Testing facilities available:

   - Universal Testing Machine
   - Compression Testing Machine
   - Rapid Chloride penetration testing apparatus
   - Permeability of concrete
   - Rebound Hammer
   - Ultrasonic pulse velocity apparatus
   - Blaine Air Permeability apparatus for fineness of cement
   - Vicat's apparatus for consistency and initial & final setting time of cement.
   - Le Chatelier's Apparatus for soundness of cement
   - Le Chatelier's specific gravity bottle for cement
   - Flow Test Table for fresh concrete
   - Slump flow test, L Box test, J –ring test, V funnel test for self-compacting concrete

2. **Engineering Mechanics Laboratory:**
   Testing facilities available:

   - Universal force table apparatus
   - Polygon of force apparatus
   - Friction apparatus
   - Winch Crab Single Purchase
   - Winch Crab Double Purchase
   - Compound screw jack with traverse motion
   - Parallel forces apparatus
   - Bell Crank lever apparatus
   - Rockwell / Brinell Hardness Testing Machine
   - Izod / Charpy Impact Testing Machine

3. **Transportation Laboratory:**
   Testing facilities available:

   - Modified Marshall apparatus
   - Marshall apparatus
   - Pensky-Marten flash point apparatus
   - Ductility test apparatus
   - Los-Angeles abrasion test apparatus
   - Ring and ball apparatus
   - Specific gravity & water absorb test of aggregates apparatus
   - Standard penetrometer of bitumen
   - Viscometer (digital)
   - Automatic compactor

4. **Fluid Mechanics, Hydraulics and Water Resources Laboratory:**
   Testing facilities available:

   - Reynold's apparatus,
   - Impact of jet on vanes,
   - Free and Forced vortex apparatus,
   - Discharge over notches (Rectangular, Trapezoidal and Triangular),
   - Metacentric height apparatus,
   - Bernoulli' theorem apparatus and Pitot tube apparatus
   - Discharge through Venturimeter, Orifice meter and Rotameter
   - Major and Minor frictional losses setup along with flow measurement,
   - Pressure measurement using differential, inclined, U-Tube manometers and Bardon Pressure gauge.
   - Measurement of fluid properties and center of pressure.

5. **Geomatics Engineering Laboratory:**
   Testing facilities available:

   - Total station & reflectors with fiberglass telescope tripod
   - Auto level
   - Plane table with tripod
   - Transit Vernier theodolites
   - Gramin GPS ETREX 30 X MODEL
   - Dumpy level
   - Digital planimeter
   - Surveyors and prismatic compasses

6. **Structural Analysis Laboratory:**
   Testing facilities available:

   - Deflection beam apparatus
   - Elastically coupled beam apparatus
   - Redundant joint apparatus
   - Clarkes max-well reciprocal theorem apparatus
   - Unsymmetrical bending apparatus
   - Curved beam apparatus
   - Deflection of truss apparatus
   - Three hinged arch apparatus
   - Two hinged arch apparatus
   - Portal frame apparatus

7. **Geotechnical Engineering Laboratory:**
   Testing facilities available:

   - Digital Universal Triaxial test apparatus
   - Direct shear test apparatus
   - California Bearing Ratio (CBR) testing apparatus
   - Consolidation test apparatus
   - Unconfined Compression Strength (UCS) test apparatus
   - Vane shear test apparatus
   - Constant and falling head permeability test apparatus
   - Hydrometer set– Wet Analysis

- Plummet balance
- Mechanical Sieve Shaker
- Hot Air Oven

8. **Environment Science and Chemistry Laboratory:**
   Testing facilities available:

   - Conductivity Meter Auto Digital
   - pH Meter Auto Deluxe
   - Biological Oxygen Demand (BOD) Incubator
   - Flocculator (Jar Apparatus)
   - High Volume Air Sampler
   - Hot air oven
   - Spectrometer Digital
   - TDS Meter
   - Chemical Oxygen Demand (COD) Digester
   - Binocular Microscope
   - Autoclave

List of Software Available

- **2D & 3D CAD Design & Modeling :** AutoCAD, AutoCAD Civil 3D, MicroStation, MicroStation PowerDraft

- **Architecture & Architectural Engineering :** AECOsim Building Designer, GenerativeComponents, Bentley Navigator, promis•e Professional, AECOsim Energy Simulator, Hevacomp Mechanical Designer, Hevacomp Electrical Designer, Hevacomp Simulator

- **3D Imagery, Pointclouds, Mapping & Geotechnical :** Bentley Descartes, Bentley Map Enterprise, gINT Professional
  On Campus use only: Bentley Pointools

- **Road, Bridge & Rail:** InRoads Suite, GEOPAK Suite, Bentley MXROAD Suite, Power InRoads, Power GEOPAK, Bentley PowerCivil for Country, Bentley PowerSurvey, LEAP Bridge Enterprise, Bentley Rail Track, Power Rail Track, Power Rail Overhead Line On Campus use only, Bentley topography

- **Structural Engineering:** STAAD.Pro, STAAD Foundation Advanced, RAM Structural System, RAM Elements, RAM Concept, RAM Connection, ProStructures, Bentley Rebar, Bentley Power Rebar

- **Hydraulics & Hydrology :** WaterGEMS, WaterCAD, HAMMER, SewerGEMS, SewerCAD, CivilStorm, StormCAD, PondPack, CulvertMaster, FlowMaster

- **Offshore & Naval Engineering :** MAXSURF Enterprise
  On Campus use only: SACS Marine Enterprise, SACS Offshore Structure Enterprise, MOSES Advanced

- **Plant Design & Operation :** Bentley OpenPlant Modeler, Bentley OpenPlant PowerPID, Bentley OpenPlant Isometrics Manager, AutoPLANT Modeler, AutoPLANT P&ID, Bentley AutoPIPE