

❖ **Laboratory equipments of “Lab of Engineering geology & Hydrogeology, School of geology, Aristotle University of Thessaloniki**

**Lab equipment used by the research team:**

- **Soil mechanics:** a) Hand driven drilling machines for soil with sampling accessories and sample extractors, b) grain size analysis system with sieves of Buehl+Faubel and 2 vibration machines for grain size soils and hydrometers Bouyoucos 151 & 152 and special mixers, of Eijekelkamp, for fine grained soils, c) 2 electronic balances (FX-320 of AND), d) 2 Casagrande apparatuses, for measuring the Atterberg limits (Eijekelkamp) e) Lab. cone penetrometer (Geonor) for measuring the Atterberg limits and the (approximate) shear strength of soil f) 2 portable apparatuses for measuring the soil moisture (SPEEDY - Thomas Asworth), g) 1 porosimeter (Eijekelkamp), h) 2 hand driven portable apparatuses for measuring uniaxial strength and strain of soils (ELE), i) 3 oedometers with electronic micrometers (Geonor), measuring settlements h) a completed electronic system for triaxial tests (GDS), with independent electronic system for the preparation of samples, k) a Proctor test system, for measuring the moisture for soil compaction (Eijekelkamp), l) 1 oven (Hovo), m) portable apparatuses – Van testers and pocket penetrometers -for shear tests.
- **Rock mechanics:** a) one 45 tones electro-driven press for uniaxial strength measurements, (Weber), with electronic strain gauges (KYOWA) for the determination of the Young Modulus, Poisson Ratio and anisotropy of the samples b) a PUNDIT ultrasonic non destructive digital tester with transducers of 54KHz, 500 KHz and conical of 54 kHz (PUNDIT – CNS electronics), for measuring the ultrasonic velocity through the stones in order to determine the dynamic elastic parameters, the anisotropy, the depth of the surface damage of the materials as well as the effectiveness of the decided intervention, c) benzene driven core driller for surface rock sampling (core bits of Diamond Board), d) electric abrasion-polishing machine (WIRTZ) for preparing rock samples for uniaxial and abrasion resistance tests, e) portable Schmidt hammer for in situ uniaxial strength measurements, f) geological compasses, (Klar type, Freiburger Prazisionsmechanik), g) theodolite h) GPS, i) portable SURFER digital Ultrasonic detector for in-situ measurements.  
**Computers:** a) 4 desk top computers b) 2 inkjet (A4 & A3) and 1 laser colour printers, c) scanner d) laptop for outside investigation, e) softwares on engineering geology f) other peripherals, g) video-projector h) over had projectors

**Equipments used both by the research team and other reseaches of the Laboratory of Engineering Geology and Hydrogeology:**

- **Hydrogeology:** a) Bore hole water samplers (Hydro-Bios), b) bore hole thermometers, c) portable pH meters (HACH) and conductivity gauges (HACH) for bore holes and lab tests, d) stream and river water velocity gauges (A. OTT. KEMPTEN), water level gauges for bore holes (a) Soil Test and b) Hydrogeological Service)
- **Hydrochemistry:** a) portable electronic direct reading Spectrophotometer, DR/2000 (HACH), b) a Flame photometer (JENWAY), c) electronic balance (FX-320 of AND), d) water distiller (KOTTERMANN)
- **Geothermy:** a) 3 electric thermometers with pt sensors with bore hole cables of 500, 300 and 250 m, b) 2 palmtop thermometers, with pt sensors, (Digitron 3204 PE) c) 2 portable conductivity gauges (HANNA Hi 8033 & Hi 8733), d) a potable kit pHmeter (HANNA Hi 9024-C), a portable system for water sampling and in situ chemical analysis (portable spectrometer - HACH)