

Northern Technical University
Technical Engineering College / Mosul
Department of Building and Construction Engineering Techniques

Laboratories Guide of the Department of Building and Construction Engineering Techniques

Intro Banner

Logo Left

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Engineering Illustration

Introduction

Scientific laboratories in the Building and Construction Department serve as an essential pillar in supporting the educational and practical process. They provide an integrated training environment for students and contribute to enhancing scientific and applied research in the fields of civil and structural engineering. This guide aims to document the detailed information regarding the available laboratories and equipment.

Objectives of the Laboratories

- Support curricula through practical application.
- Prepare an appropriate environment for conducting scientific research.
- Train students on using devices and conducting standard engineering tests.
- Contribute to community service by performing tests for government institutions and the private sector.
- Maintain the highest standards of safety and quality.

List of Laboratories in the Department

1. Construction Materials Laboratory
2. Concrete Laboratory
3. Soil Mechanics Laboratory
4. Surveying Laboratory
5. Computer Laboratory

Detailed Description of the Laboratories

1. Construction Materials Laboratory

- **Location:** Dr. Maan's Laboratories Building
- **Laboratory Code:** LPH00010
- **Area:** 99.76 m²

2. Concrete Laboratory

- **Location:** Dr. Maan's Laboratories Building
- **Laboratory Code:** LPH00011
- **Area:** 169.36 m²

3. Soil Mechanics Laboratory

- **Location:** Dr. Maan's Laboratories Building
- **Laboratory Code:** LPH00009
- **Area:** 99.76 m²

4. Surveying Laboratory

- **Location:** Dr. Maan's Laboratories Building
- **Laboratory Code:** LGE00005
- **Area:** 96.234 m²

5. Computer Laboratory

The computer laboratory of the Building and Construction Engineering Techniques Department consists of two rooms. The first room contains 11 high-specification desktop computers in addition to a display screen, and the second room contains 8 high-specification desktop computers along with a display screen.

- **Location:** Classrooms Building
- **Laboratory Code:** LGE00006
- **Area:**
 - First Room: 49.5 m²
 - Second Room: 58.86 m²

Computer Lab 1

Computer Lab 2

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Divider Line

Equipment Inventory List: Construction Materials Laboratory

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
1	جهاز لوس انجلوس	Los Angeles Abrasion Machine	A device that tests the abrasion and wear of aggregates and rocks.	Los Angeles Machine
2	محرق كهربائية	Electrical furnace	An electric incinerator with temperatures reaching up to 800 degrees Celsius.	Electrical furnace
3	مطحنة مواد ناعمة	Fine materials grinder	A device for grinding fine materials to micro-scale sizes.	Fine materials grinder
4	فرن كهربائي	Electrical oven	An electric oven reaching up to 300 degrees Celsius.	Electrical oven
5	جك هيدروليكي 50 طن	Hydraulic jack 50 Tons	A hydraulic jack used for applying loads with a capacity of 50 tons.	Hydraulic jack 50 Tons
6	جك هيدروليكي 20 طن	Hydraulic jack 20 Tons	A hydraulic jack used for applying loads with a capacity of 20 tons.	Hydraulic jack 20 Tons
7	هيكل حديدي لفحص العتبات الخرسانية	Steel frame of flexural test	A steel structural frame for testing structural elements with a capacity of 30 tons and a span of 2 meters.	Steel frame of flexural test
8	خلية تحمل سعة 30 طن	Load cell 30 Tons capacity	A load cell utilized to measure applied loads with a capacity of 30 tons.	Load cell 30 Tons capacity
9	جهاز قارئ بيانات	Data logger	A multi-purpose five-channel data reader.	Data logger
10	رافعة هيدرولوكية	Hydraulic crane	A mobile hydraulic crane with a capacity of 2 tons.	Hydraulic crane

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Equipment Inventory List: Concrete Laboratory

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
1	جهاز فحص الانضغاط Matest 200 طن	Compression testing machine (Matest 200)	Used for testing the compressive strength of concrete cubes across all engineering works, and determining the suitability of the implemented concrete according to standard requirements.	-
2	جهاز فحص الجسور Matest	Beam Testing Machine Matest	A device to test the flexural strength of specimens (such as concrete beams) by applying a concentrated center-point load and measuring force until fracture.	-
3	جهاز الفحص العام لحديد التسليح Utest	Universal testing machine	A versatile device for measuring the tensile strength of materials. It is used to test reinforcing steel of various sizes and steel sections used in engineering works, with the capability to plot stress-strain curves.	-
4	جهاز Autochul	Autochul Device	An automated device to measure or monitor changes in the length of concrete or cement specimens over time due to shrinkage or expansion.	-
5	وحدة ترطيب ايطالي	Italian Moisture Conditioning Unit	A unit used to regulate the moisture percentage in specimens or materials prior to testing to preserve standard conditions.	-
6	جهاز Vicat مع ملحقاته	Vicat Apparatus with Accessories	A device for determining the initial and final setting times of cement paste using the Vicat needle.	-

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
7	جهاز Vicat الالكتروني مع ملحقاته	Electronic Vicat Apparatus with Accessories	An electronic version of the Vicat apparatus that works automatically and displays readings on a digital screen with enhanced accuracy.	-
8	جهاز منصدة فحص جريان مونة السمنت + قالب + مطرقة	Cement Flow Table Testing Device + Mold + Hammer	A device to determine the flowability and consistency of cement paste or mortar by measuring its spread on a vibrating table.	-
9	جهاز المحمم المائي	Water Bath Device	A heated water bath kept at a constant temperature to preserve specimens under standard conditions before or during testing.	-
10	جهاز حاضنة لي شاتليه لفحص الصلادة	Le Chatelier Incubator for Hardness Testing	A constant-temperature thermal incubator used to hold specimens for hardness testing or curing.	-
11	جهاز قياس المحتوى الهوائي لمونة السمنت Utest	Utest Air Content Measurement Device for Cement Mortar	A device utilized to measure the percentage of entrained air in cement mortar via the pressure method.	-
12	جهاز بلين لنعومة السمنت Utest	Utest Blaine Apparatus for Cement Fineness	A device to measure the fineness of cement powder using the air permeability method (Blaine method).	-
13	جهاز جيلور	Gilor Device	A device used to determine the wear or abrasion resistance of aggregates or other materials.	-
14	جهاز فحص الموجات فوق الصوتية matest	Ultrasonic Pulse Velocity Tester Matest	An ultrasonic testing device used to measure pulse velocity in concrete to evaluate its quality or detect internal defects.	-
15	جهاز فحص المطرقة Schmedit	Schmidt Hammer Tester	A Schmidt rebound hammer device used to measure the compressive strength of concrete non-destructively in-situ.	-
16	جهاز فحص عامل الرص	Consistency Factor Testing Device	A device to measure the workability of concrete or mortar by determining its compaction degree (Compacting Factor).	-

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
17	قاسمة نماذج	Sample Divider	A device used to split samples evenly into smaller sub-samples while maintaining the representation of the original batch.	-
18	جهاز فحص الشد لمونة السمنت	Tensile Testing Machine for Cement Mortar	A machine designed to measure the tensile strength of cement mortar by loading the specimen until failure.	-
19	فرن كهربائي 120 لتر Utest	Electric Furnace 120 liters Utest	An electric oven with a capacity of 120 liters for drying or heating samples at high temperatures.	-
20	فرن كهربائي 300 v[M[	Electric Furnace 300 [v[M	A larger capacity electric oven (300 liters) used for identical laboratory drying, burning, or heating purposes.	-
21	هزاز مناخل قطر 200 ملم نوع الفا	Sieve Shaker Diameter 200 mm Alfa Type	A mechanical shaker device used to vibrate sieves and grade materials according to grain size.	Sieve Shaker
22	جهاز فحص الوزن النوعي للركام (ميزان + حوض)	Aggregate Specific Gravity Testing Device (Scale + Container)	A combined scale and water container apparatus to measure the specific gravity and bulk density of aggregates.	-
23	اسطوانة حديد لفحص كثافة الركام	Steel Cylinders for Testing Aggregate Density	Standard metal cylinders used to measure the loose or compacted bulk density of aggregate.	Steel Cylinders
24	مخروط فحص SSD للرمل مع المطرقة	Sand SSD Test Cone with Hammer	A standard cone and tamping hammer to determine the Saturated-Surface-Dry (SSD) condition of fine aggregate (sand).	Sand SSD Test Cone
25	عجانة (خفاقة) مونة السمنت	Cement Mortar Mixer	A mechanical mixer to mix cement mortar with precise water and fine material proportions to guarantee mixture homogeneity.	-

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Equipment Inventory List: Soil Mechanics Laboratory

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
1	جهاز فحص القص المباشر Alfa	Direct shear	Used to test the shear parameters of the soil.	-
2	جهاز فحص القص المباشر ايطالي	Direct shear	Used to test the shear parameters of the soil (Italian model).	-
3	جهاز فحص الانضمام	Consolidation	Used to test soil consolidation characteristics.	-
4	جهاز فحص الانضمام تركي	Consolidation	Used to test soil consolidation characteristics (Turkish model).	-
5	جهاز فحص مارشال	Marshal	For asphalt, bituminous mixtures, and highway testing.	-
6	جهاز فحص اختراق المخروط	Cone penetration	For various soil penetration tests.	-
7	جهاز فحص حدود اتربرك	Atterberg Limit	Used to determine the Atterberg limits value of plastic soils.	-
8	جهاز فحص النفاذية ايطالي	Permeability	Used to find the permeability coefficient of soil (Italian model).	-
9	جهاز فحص النفاذية تركي	Permeability	Used to find the permeability coefficient of soil (Turkish model).	-
10	جهاز فحص الضغط الغير محصور	Unconfined compression	Used to find the shear parameter (C) and the unconfined bearing capacity of soil.	-
11	جهاز فحص CBR وملحقاته	California bearing ratio	Used to evaluate the bearing capacity of subgrade soil and pavement layers.	-

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
12	مناخل مختلفة المقاييس	Sieves	A set of sieves with different mesh sizes for soil particle size analysis.	-
13	جهاز الهيدروميتر	Hydrometer	Used to analyze particle size distribution in very fine soils.	-
14	جهاز فحص الحدل مع ملحقاته	Proctor	Used to determine the maximum dry density and optimum moisture value of soil.	-
15	جهاز فحص الضغط الثلاثي المحاور	Triaxial pressure	Used to determine the triaxial compression and shear strength parameters.	-
16	فرن تجفيف تركي بدرجة 300 درجة مئوية	Oven	A Turkish drying oven operating up to 300°C for drying different soil samples.	-
17	جهاز سنترفيوج لفحوصات الطرق	Centrifuge	Centrifuge extractor used to separate bitumen from asphalt paving mixtures.	-
18	قوالب ومطرقة لفحص مارشال الخاص بالطرق	Marshal moulds and hammer	Compaction moulds and hammer utilized for evaluating asphalt stability and flow.	-
19	جهاز فحص الاستطالة لفحوصات الطرق مع ملحقاته	Ductility apparatus	Measures the tensile elongation capacity of bituminous materials.	-
20	قاعدة فحص الشد الغير مباشر للقيربة والتربة	Indirect tensile strength base	Testing base used to measure the indirect tensile strength of soil and asphalt.	-
21	جهاز مخروط الرمل لفحص الكثافة الحقلية	Sand cone	Sand cone apparatus used to find the in-situ dry density of soil layers.	-

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Equipment Inventory List: Surveying Laboratory

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
1	جهاز التسوية	Level	This device is one of the most widely used and essential instruments for leveling tasks, such as highway construction, water and sewage network alignment, and determining cut-and-fill quantities for land surveying. Engineers and surveyors heavily rely on it across various projects, and it is regarded as highly user-friendly compared to other advanced surveying instruments. By using this device and executing specific mathematical computations, the elevations (reduced levels) of targeted points are successfully established.	-
2	جهاز الثيودوليت	Theodolite	It is an optical surveying instrument used to measure horizontal and vertical angles. It serves as a vital tool in construction and civil engineering, enabling engineers and site workers to verify measurements and dimensions accurately. Its applications include measuring angular edges of large structures, detecting subtle height differences, taking geometric readings of curved objects, defining slopes in winding regions, analyzing rotation speeds, and laying out coordinate points on specified site lines.	-

No.	Device Name (Arabic)	Device Name (English)	Device Description	Device Image
3	جهاز المحطة الشاملة	Total Station	An electronic optical surveying instrument that integrates an electronic theodolite for horizontal and vertical angle measurement, an Electronic Distance Measurement (EDM) module, and an on-board microprocessor for automated data storage and triangulation computations. It is primarily utilized by land surveyors and civil engineers either to collect land features for topographic mapping or to accurately set out construction layouts (e.g., roads, houses, boundaries).	-