Cost Effective Magnetism Experimental Setups for Education & Research – Under 8 Lakhs

A set of 18 interactive hands-on experiments powered by Dexinmag's precision instruments and fully integrated with MAGTRANS Systems' support.

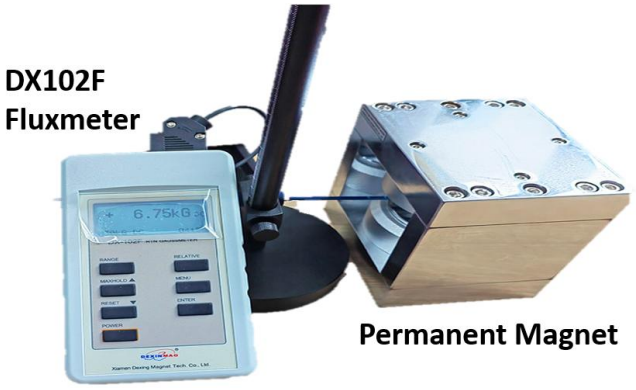
MAGTrans Systems Private Limited is an ISO 9001-2015 company with **45 years of experience** representing National and International reputed companies in supply, service and maintenance of **Intelligent Process Cooling Solutions, Testing, Measuring & Analytic equipment, Reliability & Environmental Testing Equipment** and a complete product range of Magnetic Measurement instruments & Systems in India. We Represent **DEXINMAG**'s Systems and Solutions in India.

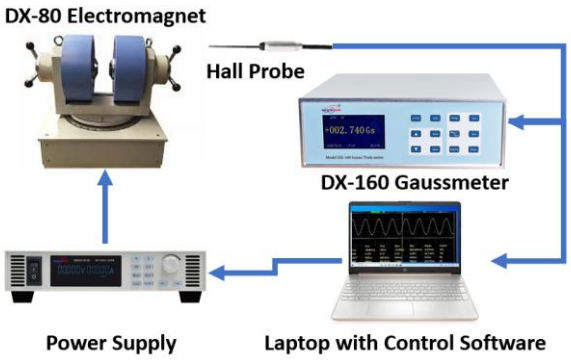
DEXINMAG offers a wide range of **Cost-Effective Magnetic Systems** for your Scientific and Laboratory Needs. Our high-performance products integrate seamlessly with minimal programming, providing you with high modularity leading to lowered maintenance and upgrading costs.

Experiment 1: Generation of Magnetic Field using Permanent Magnet

A constant magnetic field is generated using permanent magnets (NdFeB, SmCo, AlNiCo, Ferrite) with a fixed air gap between the poles for rigidity and stability to demonstrate how fields change from the surface of the pole to the center. The setup includes permanent magnets, a Hall probe, and a DX102F flux meter.

Cost: ₹ 2.5 Lakhs + GST, while additional combinations of magnet ranges, Hall probe thicknesses, and flux meters are available at extra cost.





Experiment 2: Air Cooled Electromagnet setup with Gaussmeter Feedback Control

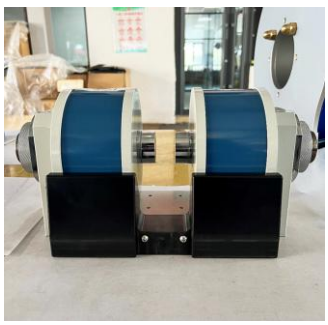
The experimental setup uses an Air Cooled/Water Cooled Electromagnet, Gaussmeter with Hall Probe, 300W Unipolar Power Supply to generate uniform DC magnetic fields by varying current, The Feedback software can be used to set a fixed Field with High Stability in which the gaussmeter measures the field and signals the Power Supply to increase or decrease the Current

Cost: ₹7.5 Lakhs + GST (expandable with higher coil ranges, probe types, software, and power options).

Experiment 3: Linearity and Calibration of Electromagnet Field Output

Using an Electromagnet, Gaussmeter with Hall Probe, and 300W Unipolar Power Supply, the setup demonstrates multi-point calibration and linearity of magnetic flux (~0.5 T) by varying current, measuring B vs I response, and measuring the linearity error to demonstrate <0.5% error rate.

Cost: ₹5 Lakhs + GST (expandable with higher coil ranges, probe types, software, and power options).



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Experiment 4: Analyzing Magnetic Field generated by a Solenoid

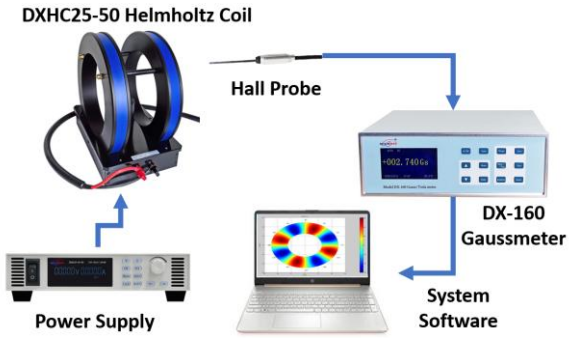
Using a Solenoid Coil, Gaussmeter with Hall Probe, and 300W Unipolar Power Supply, this setup demonstrates the Biot–Savart law by measuring and mapping axial and radial magnetic field components (Br, Bz) inside and around the solenoid, and helps student visualize field decay at the ends.

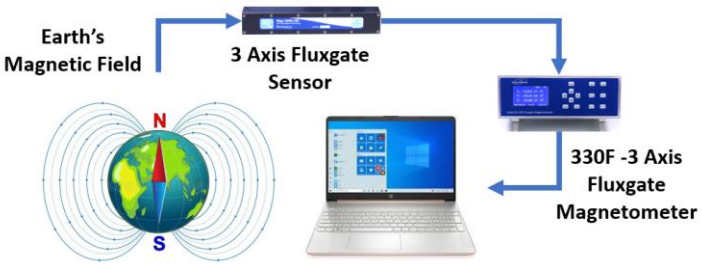
Cost: ₹5 Lakhs + GST (expandable with higher coil ranges, probe types, software, and power options).

Experiment 5 Measurement of Gradient Magnetic Field Using Helmholtz Coil

The experimental setup uses a Helmholtz Coil, Gaussmeter with Hall Probe, and a 300W Unipolar Power Supply to generate uniform DC and gradient AC magnetic fields (0–1000 Gs, 0–20 Hz) by varying voltage/current, with magnetic flux measured at different voltage/current points and we measure it and map the fields via interface software.

Cost: ₹5 Lakhs + GST (expandable with higher coil ranges, probe types, software, and power options).





Experiment 6 Measuring Low Earth Magnetic Field by Fluxgate Magnetometer

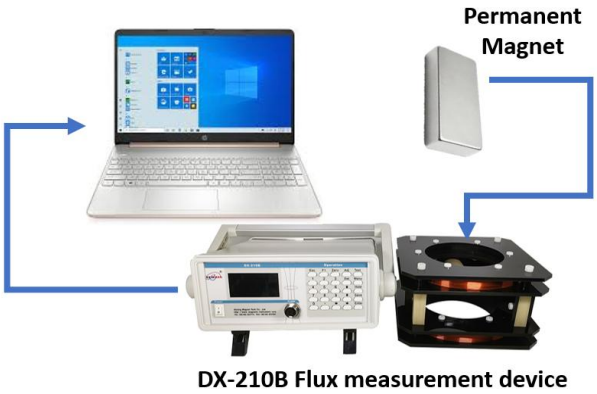
Using a **Three-Axis Fluxgate Magnetometer** with probe and USB interface, this setup is used to measure Earth's weak magnetic field (~30–60 μT) in its resolving vector components **(Bx, By, Bz)**. The magnetic field B can then be calculated by combining the three components.

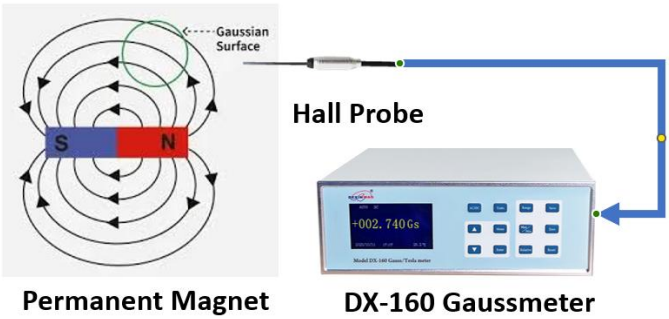
Cost: ₹7 Lakhs + GST (expandable with advanced probes, software, and accessories).

Experiment 7 Demonstrating Faraday's Law and Lenz's Law

Using a Flux measurement device, permanent magnet (Nb), and USB interface, this experiment visualizes Faraday's Law and Lenz's Law by mapping magnetic flux regions, and showing Electromotive Force and its opposing currents in directions.

Cost: ₹5 Lakhs + GST (expandable with varied probes, magnets, and fluxmeter models).





Experiment 8 Demonstration of Gauss's Law for Magnetism

Using a 3-axis Gaussmeter with Hall probe and bar magnet, this experiment demonstrates Gauss's Law for Magnetism ($\oint B \cdot dA = 0$) by systematically measuring field vectors (Bx, By, Bz) on all six faces of the magnet to demonstrate continuous field loops and prove that there are no monopoles.

Cost: ₹4 Lakhs + GST (expandable with varied probes, magnets, and Gaussmeter models).

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Experiment 9 Demonstrating Magnetic Interference using Magnetic Shielding Materials

Using a Gaussmeter with Hall probe, shielding materials, and a Helmholtz coil powered by a 300W supply, we can demonstrate magnetic shielding by generating AC/DC fields (~10 Gs @ 60 Hz) and measuring field strength inside various shielding materials as they are moved within the coil, showing how grounding, shielding, and cable separation reduce interference.

cost: ₹7.5 Lakhs + GST (expandable with varied probes, coils, shield materials, and Gaussmeter models).

DX-30 Hall Effect System For Semiconductors

Experiment 10 Demonstrating Hall Effect in Semiconductors

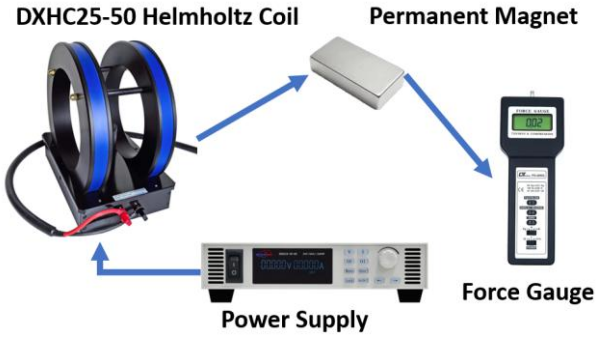
Measure the Hall voltage in a semiconductor slab to determine key material properties. A thin slab (e.g., germanium) is placed in a uniform magnetic field (up to 0.5 T from a Dexinmag electromagnet). A constant current is passed through its length, and the transverse Hall Voltage (V_H) is measured.

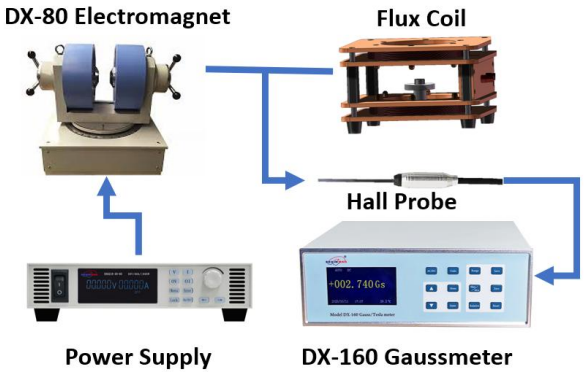
cost: ₹7.5 Lakhs + GST (expandable with varied probes, coils, shield materials, and Gaussmeter models).

Experiment 11 Measuring magnetic Force caused by Magnetic Field

Using a digital force gauge, Nb permanent magnet, Helmholtz coil, and 300W DC power supply, this experiment measures magnetic force by varying current and air gap in a electromagnet, recording force on the magnetic core to plot Force vs. Current and Force vs. Gap for analyzing magnetic interactions;

Cost: ₹5 Lakhs + GST (expandable with varied magnets, coil windings, power supplies, gauges, and software).





Experiment 12 Analyze Behavior of Ferromagnetic Materials

Using a Gaussmeter with 3-axis Hall probe, flux coils, DXXZ rotating electromagnets, 300W power supply, and ferrite magnets in motor stators, this experiment demonstrates a 3D Magnetic Field Mapper by acquiring X, Y, Z data with the probe, processing it via software to generate 3D field distribution, Wave harmonic analysis, and plotting B–H loops.

Cost: ₹8 Lakhs + GST (expandable with varied magnets, probes, coils, electromagnets, and Gaussmeter models).

Experiment 13 Different Types of Magnetic field Generators and their measurements

This experiment compares magnetic field generation from electromagnets, Helmholtz coils, and solenoids, loops. Using a Gaussmeter with Hall probe, programmable 300W power supply, and interface software, students can map fields to verify Biot–Savart, Faraday, and Lenz's laws

Cost: ₹8 Lakhs + GST (expandable with varied coils, magnets, probes, and power supplies).

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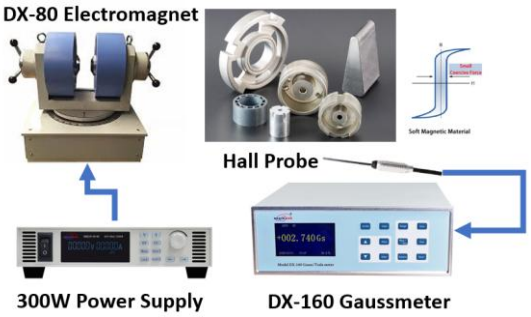


Experiment 14 Demonstrating Soft Magnetic Material behavior

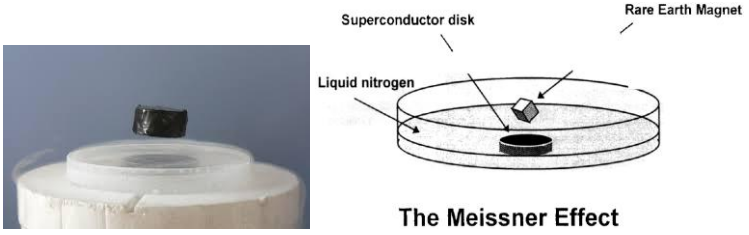
Using an electromagnet with 300W supply, Gaussmeter + Hall probe, and interface software. the experiment helps students visualize the effect of Magnetic Field on a Soft Magnetic Material and how the material loses properties after the field is removed.

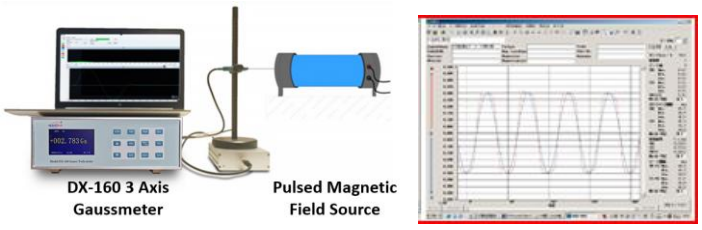
Cost: ₹8 Lakhs + GST (expandable with varied magnets, probes, supplies, and software).

Experiment 15 Observing Superconductivity & Meissner Effect

This experiment demonstrates superconductivity through zero resistivity and Meissner effect (magnet levitation due to flux exclusion below Tc). By using Liquid Nitrogen, a small power supply, an NdFeB Magnet and a Superconductor such as YbCo, we can demonstrate Meissner Effect to the students.

Cost: ₹ 2.5 Lakh + GST (expandable with varied superconductors, nitrogen quantity, and containers).





Experiment 16 Demonstration of Pulse Magnetic Field using DX-160 Gaussmeter

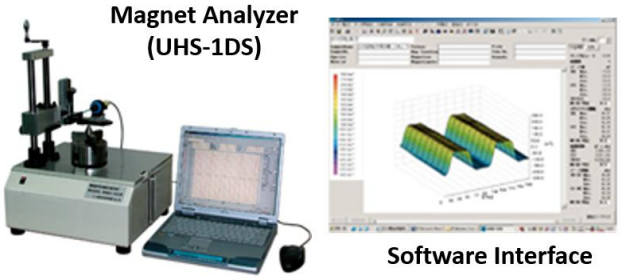
Permanent magnets do not produce pulsed or dynamic fields. These arise from alternating current (AC). Pulsed electromagnetic fields (PEMFs) have both frequency and intensity, which can be visualized to the students using a gaussmeter and mapped via interface software.

Cost: ₹6 Lakhs + GST (expandable with other AC sources, probes, and Gaussmeter models).

Experiment 17 Demonstration of Magnet analyzer (UHS-1DS, UHS-3DS)

A Magnetic Analyzer (MA) shows students how to use alternating magnetic fields to non-destructively evaluate ferromagnetic parts to assess various magnet properties and material grade. It offers high accuracy and stable results via low-frequency magnetization/demagnetization, automatic data conversion and comes in a compact design.

Cost: ₹6 Lakhs + GST (expandable for probes, 30 mT–5 T ranges, temp. up to 200 °C).



Experiment 18 Using Magnetic Yoke for Non Destructive Testing

The MT-180 portable magnetic particle yoke operates from a belt mounted rechargeable Li-Ion battery/Inverter to provide AC or DC magnetization, selectable at the press of a button. It is powerful, with ≥ 15 lbs. during AC/inverter operation and ≥ 40 lbs. during DC operation. This lightweight yoke is only 4.4 lbs., (2 Kg,) and the battery pack/inverter is only 2.6 lbs. (1.2 Kg.).

Cost: ₹1.5 Lakhs + GST (Expandable with higher ranges, operation modes with higher battery capacity)

MAGTrans would be extremely glad to discuss your requirements, resolve your queries and guide you in choosing the right solutions for your laboratory. Your journey of academic research is important to us and we will be more than happy to assist you every step of the way. Please reach out to us at:

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