# INFRASTRUCTURE AND FACILITIES

Central facilities are used by the entire IITGN community, and some of these (e.g. library) are open to outsiders as well. Currently, the following facilities are functioning. More facilities will be added as the Institute grows.

## Library Facilities

The Central Library of IIT Gandhinagar is being developed to make it one of the best libraries in the area to attract scholars from all over in different fields. The Institute allocates funds liberally to meet and exceed the teaching and research needs of the students and faculty. Sufficient copies of text and reference books are procured for the courses offered. Other books of interest to students, staff and faculty are also readily acquired. The library has an agreement with IIT Bombay to obtain books and journals on loan from its library. Most of the reputed research journals are now available through on-line resources such as Science-Direct, JSTOR, Annual Reviews, Scopus, Springer Link, ASME, IEEE/IET Electronic Library (IEL). Other electronic journals accessible from IIT Gandhinagar include Open Access Directories/Journals, Institutional Repositories etc. Feasibility of subscribing to other journals is under review. Many popular science journals, news magazines and Indian journals, not available on-line at present, are received as print copies for easy access. Information Alert Service provides the following information to its users: list of additions, new arrivals, status of requested books, faculty publications display and display of complementary newsletters, etc.



The library currently issues books to students, faculty and staff. The possibility of offering this facility to authorized persons and organizations is under consideration. Photocopying and printing facilities are available to everyone. The library is open from 0900 to 2200 hrs from Monday to Saturday. The library remains open from 0900 hrs to midnight on all days during the examinations.

## Computer Facilities

Computer facilities at IITGN have been developed with high-end hardware, a wide range of software and excellent connectivity so that students, faculty and staff can carry out their work without interruptions. They can view and download information efficiently for their research, home assignments and other scholarly activities. The LAN setup integrates the whole IITGN into one unit. The Institute premises and the student hostels are Wi-Fi enabled so that personal laptops can be connected to the internet throughout the Institute. Over 50 PCs are available to the students in a common Computer Laboratory for programming and other purposes. The Computer Laboratory is also used for teaching. All faculty members and research scholars have been provided with individual PCs. Printing, scanning and photocopying facilities are extensively available on individual basis as well as for common use. Individual email accounts have been provided to IITGN students, faculty and staff with the facility of sending bulk email to common groups, for example, sending home assignments to students in a course or to students in a particular branch and year. Important computational software like Mathematica, PSCAD 4.2, STATA 11.1, Auto CAD have been subscribed to.



## Medical Facilities

A qualified medical practitioner (M.B.B.S., Diploma in Medicine, Fellow Infectious Disease, Italy) is available on the Institute premises for several hours every day to provide medical advice to students, staff and faculty. The doctor can also be consulted at her clinic as well as the Life Care Hospital situated nearby. These medical facilities are completely free for the students, who are also covered under a medical insurance plan.

## Gymnasium

The Institute Gymnasium has been established to aid students, staff and faculty and their families to maintain their physical fitness. The gymnasium equipment have been procured in line with international standards. These include various cardio machines like tread mill, upright bike and elliptical, and strength equipment like cross cable bicep preacher, chest press smith machine, highlate pulling, packdac, abdominal board and leg extension/leg curl. Well-trained professional coaches are available to impart training to the users on these equipment. They also help in preparing diet plans, workout schedules, and provide instructions in yoga, floor exercise and stretching exercise. The Gymnasium is open every day from 1700 to 2000 hrs.




## Laboratory Facilities

Laboratories are a very important component of engineering and science education. The laboratory courses are designed for the students to practice principles taught in the theory courses, and also to get hands-on training on basic machines and tools. In addition, the laboratory facilities are required by the students and faculty to carry out experimental research and development work. The current status of the Institute laboratories is described in this section.

### Chemical Engineering

All third year Chemical Engineering undergraduate students are required to take a laboratory course. The Chemical Engineering laboratory, which is in 165 sq. m. area, includes experimental set-up on Unit Operations and Reaction Engineering. The current facility includes Coiled/Plate/Fluidized/Fin-Tube Heat Exchangers and Chemical Reactors (both from Shree Fabricators and Engineers), Calorimeter and Refractometer (both from Scientific Products India). The facility is being expanded to include experiments based on Process Controls & Dynamics and Advanced Separation Techniques.

The present Chemical Engineering faculty has research interests in the fields of Particle Formation for Drug Delivery, Biochemical Engineering, and Systems Biology. A 155 sq. m. area has been provided for their research activities. A Particle Size Analyzer (Coulter Private Ltd) and an Optical Microscope with Camera facility (Nikon) have been procured to build a Particle Formation research facility. A



High Pressure Liquid Chromatography (HPLC) (Waters), Gas Chromatography (GC) (Perkin Elmer), Fermentor (Sartorious) and other basic biochemical laboratory utilities have been procured for Biochemical Engineering research.

## Chemistry

A laboratory course in Chemistry is compulsory for all first year students. The chemistry lab is housed in an area of 115 sq. m. and allows the students to practice principles taught in the chemistry theory class encompassing all three branches - Organic, Inorganic, and Physical Chemistry. The current experiments include measuring hardness of water using titration techniques, inversion of sucrose using Polarimeter (12 set-ups), Complex formation reactions using Colorimeters (3 set-ups), electrolytic conductance experiments with Conductometers (12 set-ups) and separation techniques using Thin Layer Chromatography. A fascinating and upcoming trend of research "Green Chemistry" is now part of the laboratory course.

The present faculty research interests lie in all three areas of chemistry - Organic, Inorganic, and Physical Chemistry. Present research efforts are concentrated on porphyrin macrocycles synthesis for molecular recognition applications and synthesis of pi-conjugated organic molecules with focus on both, experimental and computational studies. UV-Visible Spectrophotometer (Shimadju), Rotary Vacuum Evaporator (Buchi), and general chemistry research facilities like analytical balances (Mettler-Toledo), fume hood, recirculating chillers, hot air ovens, air and vacuum Schlenk lines



have been procured and installed. A NIR-Spectrofluorometer (Horiba Jobin Yvon), Water Purification System (TKA), and a quaternary High Pressure Liquid Chromatography (HPLC- Agilent) are being procured.

### Electrical Engineering

The Department of Electrical Engineering currently offers one laboratory course to all undergraduate students and five additional courses to Electrical Engineering undergraduate students. Laboratory facilities for all courses are located in an area of 220 sq. m. Experiments include basic studies of characteristics of semiconductor devices, active filters & Schmitt trigger, digital & combinatorial circuits, building counters & shift registers, timer circuits and analog-to-digital converters, microprocessor- and microcontroller-based experiments. The laboratory facility is equipped with Digital Storage Oscilloscope, Digital Multimeters and IC Testers, Universal IC Programmer, ScopeCorder, and all other electrical engineering laboratory utilities. In addition, the Power System Simulation Laboratory has PSCAD, a software for power system studies, licensed for 25 nodes.

The current Electrical Engineering faculty has research interests in Power Systems, Renewable Energy, and VLSI. The current research facilities include transformers of different winding geometry. A mock-up working model of wind and photovoltaic power generation systems is being developed in tandem with power electronics converters and appropriate controls. IITGN has a collaboration with Cadence under its University Programme. The VLSI-Design research and development work greatly benefits from this collaboration through many tools and facilities being provided by Cadence.



## Mechanical Engineering

The Department of Mechanical Engineering currently offers five undergraduate laboratory courses. All first year undergraduate students are required to take a laboratory course on Workshop Practice. The Manufacturing Laboratory, in 110 sq. m. area, has facilities including lathes, milling machine, vertical machining centre, electric discharge machine, welding, fitting and tin smithy equipment. The Manufacturing Laboratory is also being used to offer two laboratory courses on Manufacturing Practices and Processes for second and third year Mechanical Engineering undergraduate students. CNC turning centre, milling centre, and co-ordinate measuring machine are being procured.

All second year Mechanical Engineering students are required to take a laboratory course on Solid Mechanics and Experimental Stress Analysis. The laboratory, in 70 sq. m. area, has two MTS Universal Testing Machines of 100 kN and 200 kN capacity, Charpy impact testing machine of 450 J capacity (MTS) and Rockwell and Vickers hardness testing machines (Zwick Roell). Torsion and fatigue testing machines and a photoelasticity set up are being acquired.

The third year Mechanical Engineering undergraduate students are required to take a laboratory course on Fluid Mechanics and Fluid Machines. The laboratory is located in a 155 sq. m. area, and has set-ups for conducting experiments on fluid statics and dynamics. Centrifugal pump, gear pump, Pelton wheel and Francis turbine (Mass International), various flow measuring devices and accessories have been procured.

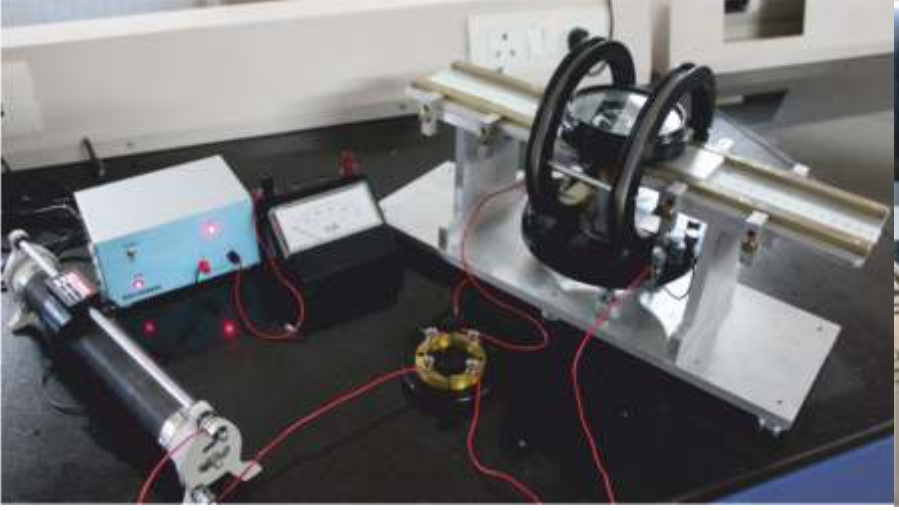


The current Mechanical Engineering faculty research interests include Aerodynamics, Polymer Composites, Dynamics and Control of Fluid-Thermal Systems, and Hydrodynamic Stability. The Manufacturing Laboratory and the Solid Mechanics and Experimental Stress Analysis Laboratory include many fabrication and research facilities required by faculty for their research. These facilities are currently being further developed and expanded according to experimental and fabrication needs.

## Physics

All first year undergraduate students at the Institute are required to take a laboratory course in basic physics. The laboratory facility, in a 120 sq. m. area, includes experiments in Optics, Electricity and Magnetism, Modern Physics, Thermodynamics, and Classical Mechanics. The equipment was procured from Indian and foreign manufacturers [Grating Spectrometer (Indosaw), Newton's Rings (Holmarc), Frank Hertz Experiment (Scientific Equipments India Ltd), Cathode Ray Oscilloscopes (Scientech, Aplab)], or fabricated by IIT Gandhinagar & IIT Bombay (Helmholtz Coil). Four sets of all experimental equipment are available to the students for hands-on experience.

In addition, IIT Gandhinagar students, in collaboration with the Inter-University Center for Astronomy and Astrophysics (IUCAA, Pune) developed an astronomical telescope, which is being used for demonstration purposes at the Institute. An experimental kit for demonstrating select concepts of Electricity and Magnetism, and Thermodynamics is also being prepared at the Institute in association



with the Indian Academy of Sciences, Bangalore.

The present Physics faculty has both theoretical and experimental research interests that include Nuclear Structure & Reaction Theory, Condensed Matter Physics, and Ferrofluids. The research equipment already procured include a Cone/Plate Viscometer (Brookfields, USA), a Thermal Conductivity Measuring System LAMBDA (F5 Technology, Germany), and many general-purpose laboratory utilities. A Raman Spectrometer is also being procured.