



**JK LAKSHMIPAT UNIVERSITY**

*(Recognised by Government of Rajasthan and covered u/s 2(f) of the UGC Act 1956)*

**Enlightening Minds. Inspiring Leadership.**

# DETAIL OF LAB FACILITIES

# IET: Chemical Engineering



## Sample Faculty Members

- ✓ *Jitendra Kumar Singh, Ph.D.*
- ✓ *Mohd. Shahnawaz Khan, Ph.D.*

## Laboratories

- *Mass Transfer Lab*
- *Chemical Reaction Engineering Lab*
- *Heat Transfer Lab*
- *Mechanical Operation lab*
- *Process Dynamics & Control Lab*

# Lab Facilities

## Chemical Engineering Research Laboratories

### Mass Transfer Lab –

*Mass transfer lab is setup to understand the basic principles of mass transfer operations and processing of the separation equipment. Researchers use following equipments mainly for their research activities:-*

- *Distillation column,*
- *Fluidized bed dryer,*
- *Liquid extraction unit,*
- *Absorption in wetted wall column,*
- *Vapor in air diffusion,*
- *Mass transfer with / without chemical reaction,*
- *Absorption in packed bed, Vapor – liquid equilibrium*
- *Batch Crystallizer.*



# Lab Facilities

## Chemical Reaction Engineering Lab –

*Chemical Reaction Engineering Lab is setup to understand the processing of basic reactors normally used in chemical industries. Researchers use following for their research activities:-*

- *Different type of reactors*
- *CSTR, RTD studies in CSTR*
- *RTD studies in plug flow reactor and in packed bed reactors.*



# Lab Facilities

## Heat Transfer Lab –

*Heat Transfer Lab is setup to understand the basic principles of heat transfer operation. Researchers use following techniques for their research activities:-*

- *Friction in pipelines and fittings*
- *Flow through packed beds and fluidized beds*
- *Diffusion coefficient*
- *Gas absorption*
- *Different types of heat exchanger and Mass transfer with chemical reaction.*





# Lab Facilities

## Mechanical Operations Lab –

*Mechanical Operation Lab provides chemical engineering researchers the opportunity to observe, analyse and apply their engineering knowledge and training to the operation of equipment and processes commonly found in many chemical industries like:-*

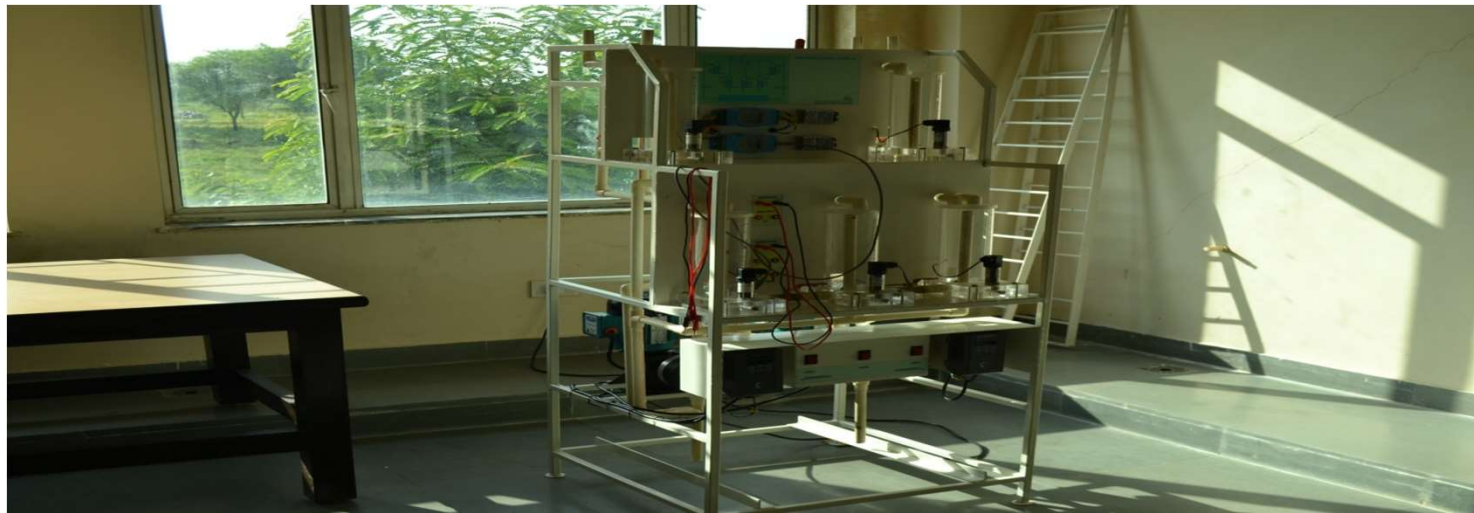
- *Rotary drum filtration*
- *Forth filtration*
- *Centrifugal pump characteristics*
- *forced draft tray dryer*
- *Vacuum notch filter*
- *Ball mill and jaw crusher.*



# Lab Facilities

## **Process Dynamics and Control Lab –**

*Process dynamics and control Lab is setup to understand the basic principles involved in chemical process control industries. Researchers uses different type of processes without controller to understand their dynamics, processes connected in series in interacting & non-interacting mode, study of I/P and P/I converter and flapper nozzle system. They also understand the response of the controller in presence of feedback controllers i.e. pressure control trainer, temperature control trainer.*



# IET: Civil Engineering



## Sample Faculty Members

- ✓ *D. K. Sharma, Ph.D, M.Tech., B.E. (MNIT)*
- ✓ *Kedar Sharma, Ph.D. (IIT-Kanpur)*
- ✓ *Tanmoy Kumar Deb, Ph.D., M.Tech.*
- ✓ *Mr. Vinod K Vishwakarma M Tech (MNIT)*
- ✓ *Mr. Amit Kumar, M Tech (MNIT)*

## Laboratories

- *Surveying lab*
- *Concrete lab*
- *Transportation Engineering Lab*
- *Engineering Geology Lab*
- *Fluid mechanics lab*
- *Computing Lab*
- *Geotechnical Engineering lab*



# Lab Facilities

## Civil Engineering Research Laboratories

### Surveying Lab –

*Surveying is a basic requirement for all Civil Engineering projects. The planning and design of projects such as construction of highways, bridges, tunnels, dams, etc. are based upon surveying measurements. Moreover, during execution, a project of any magnitude is constructed along the lines and points established by surveying. Our surveying lab has been designed to give our researchers the necessary skills in this important domain. It is equipped with:-*

- *Metallic chain*
- *Ranging rod*
- *Dumpy level*
- *Auto level, total station, plane table its accessories*
- *Electronic theodolite*
- *Prismatic compass and surveyor compass.*



# Lab Facilities

## Concrete Lab –

*In this Lab researchers studies on different types of materials, which are used in concrete and testing of concrete specimens in various exposure conditions. The concrete technology laboratory is equipped with:-*

- *Compression testing machine*
- *Oven & wicket apparatus*
- *Cement mortar vibrating machine*
- *Cement mortar mixing machine*
- *Test sieves, concrete workability apparatus, compaction factor apparatus*
- *Slump cone, ultrasonic concrete tester, rebound hammer, concrete mixer, different mould cast*

*Other facilities of physical and chemical testing of cement concrete and aggregates, flow table, permeability apparatus, flexure testing machine, abrasion resistance machine and buoyancy balance.*



# Lab Facilities

## Transportation Engineering Lab –

*The laboratory of transportation engineering in civil department is well equipped with all the required instruments and equipment such as –*

- *CBR*
- *Los angles abrasion instrument*
- *Aggregate impact test*
- *Buoyancy balance specific gravity*
- *Water absorption test and bulk density test for aggregate*
- *Flakiness index and elongation index test, etc.*





# Lab Facilities

## Engineering Geology Lab –

*Engineering geology is the application of the geologic sciences to engineering practice for the purpose of assuring that the geologic factors affecting the location, design, construction, operation and maintenance of engineering works. The realm of the engineering geologist is essentially in the area of earth-structure interactions, or investigation of how the earth or earth processes impact human made structures and human activities. The laboratory of Engineering geology is well equipped with all the required sample minerals, ores, metals, non-metals and maps, etc. that are helpful to the researchers.*





# Lab Facilities

## Fluid Mechanics Lab –

*Fluid mechanics and hydraulic machines laboratories have all comprehensive experimental set –ups catering to the requirements of researchers. The lab is outfitted with different flow measuring set-ups such as venturimeter, orifice-meter, pitot tube, etc. The laboratory is equipped with –*

- *Meta-centric Height Apparatus, Bernoulli's Apparatus*
- *Venturimeter & Orifice Meter Apparatus*
- *Notch Apparatus*
- *Reynolds Apparatus*
- *Rotameter Apparatus*
- *Laminar & Turbulent Flow Apparatus*
- *Friction Losses Apparatus*
- *Impact of jet Apparatus*
- *Pelton wheel turbine test rig*
- *Centrifugal pump test rig*
- *Reciprocating pump test rig.*



# Lab Facilities

## Computing Lab –

- 3D CAD Design and Modeling (MicroStation PowerDraft V8i and MicroStation V8i),
- Transportation (Bentley MX Road Suite V8i and Bentley PowerCivil for Country),
- Building Information Modeling (AECOsim, Building Designer V8i,
- AECOsim Energy Simulator V8i,
- Bentley Navigator and Bentley Connections Passport,
- Offshore (Bentley Maxsurf Enterprise,
- SACS Marine Enterprise, SACS Offshore Structure),
- Structural (STAAD.Pro V8i, STAAD Foundation Advanced, STAAD Global Design Code, Bentley Power Reber and RAM Concept V8i),
- Water and Waste water (SewerGEMS V8i, WaterGEMS V8i, StormCAD V8i, CivilStorm V8i and HAMMER V8i),
- 3D Imaging, Point Clouds and Mapping (Bentley Descartes V8i, Bentley MAP Enterprise and Bentley Pointools V8).



# Lab Facilities

## Geotechnical Engineering Lab –

*An understanding of soil is critical for the success of most engineering projects. Geotechnical Engineering laboratory is well equipped with all equipment required for identification and classification of soils. Major equipments includes –*

- *Liquid limit device,*
- *Cone penetrometer,*
- *Shrinkage limit test,*
- *Pycnometer, Plastic Limit set,*
- *Direct shear apparatus,*
- *Core cutter,*
- *Compaction test apparatus both heavy and light compaction,*
- *Standard penetration set,*
- *Hydraulic jack,*
- *Sieve shaker (motorized) and*
- *Hot air oven.*



# Lab Facilities

## Environmental Engineering Lab –

- *PM<sub>10</sub>, PM<sub>2.5</sub>,*
- *Water Quality Parameters,*





# IET: Computer Science Engineering



## Sample Faculty Members

- ✓ Sonal Jain, Ph.D.
- ✓ S. Taruna, Ph.D.
- ✓ Alok Kumar, Ph.D.
- ✓ Amit Kumar Sinhal, Ph.D
- ✓ Suman Saha, Ph.D
- ✓ Devendra Bhavsar, M Tech (IITB)
- ✓ Gireesh Kumar, Ph.D.
- ✓ Kshitiz Verma, Ph.D
- ✓ Santosh Kumar Verma, M Tech

## Laboratories

- *Linux Lab*
- *Networking Lab*
- *Web Technologies Lab*
- *Database Technologies Lab*
- *Microsoft IT Academy*
- *CISCO Networking Academy*

# Lab Facilities

## Computer Science Engineering Research Laboratories

### Linux Lab –

*This lab facilitates with the Linux operating system. It is designed to take them well beyond being a casual, personal user of Linux. Students deal with fundamentals and explore the various tools and techniques commonly used by Linux users, programmers, and system administrators to do their day-to-day work.*



### Networking Lab/CISCO Network Academy –

*The Networking lab includes kits and modules designed for collaboration and problem solving while encouraging practical application of knowledge through hands-on activities and network simulations. Kits include Benchmark Netsyst and I-Secureit and CISCO Academy Bundle. Cisco Network Academy facilitates networking skills foundation. Through Networking Academy Courses can earn Cisco career certifications and help fill gap in the networking jobs around the world. The online assessments provide personalized feedback to support the learning process.*

# Lab Facilities

## **Web Technologies Lab –**

*Innovations such as websites, social networking, cloud computing, e-commerce, web conferencing are changing the way we work, collaborate and play. These capabilities are all powered by the web as a backbone. Infrastructure of this lab is utilized by researchers to gain hand-on grip on web technologies. The machines are equipped with relevant software tools like Eclipse, Visual Studio 2010, 2012, 2013, PHP, Web server, XAMPP, WAMP, LAMP and Net Beans to name a few.*



## **Database Technologies Lab –**

*This laboratory supports research work related to Database Systems. The machines are equipped with tools for designing databases like the Oracle development suite, MS SQL server 2010, 2012, MY Sql Server, Postgres as well as software for creating design diagrams like Microsoft Visio.*



# Lab Facilities

**Microsoft IT Academy:** Department of Computer Science has set up Microsoft IT Academy (ITA) to provide industry-leading technology skills to help bridge the skills gap. With the Microsoft IT Academy (ITA) program, academic institutions and their educators, students and staff get digital curriculum and certifications for fundamental technology skills -- as well as courses critical for students to be successful in today's technologically evolving world. The Microsoft Official Academic Course (MOAC) series includes a complete learning and teaching framework developed specifically for use in an academic setting. Microsoft Official Courseware (MOC) is instructor-led training intended for IT professionals and developers who build, support, and implement solutions by using Microsoft technologies. It includes the following:

Microsoft E-Learning curriculum which provides unlimited access for more than 400 courses.

Ready-to-use, customizable lesson plans including links to relevant Microsoft E-Learning and free demos and videos

E-reference which provides digital access for educators to more than 600 technology books, searchable by topic, technology and subject.



# IET: Electrical Engineering



## Sample Faculty Members

- ✓ Pushpendra Singh, Ph.D.
- ✓ Jagdish Sharma, M Tech (MBM), Ph.D.
- ✓ H P Agrawal, M Tech (MNIT)
- ✓ Yogesh Rohilla, MTech (NITKurk)

## Laboratories

- *Electrical & Electronics Engineering Lab*
- *Network Analysis & Synthesis Lab*
- *Industrial Electronics Lab*
- *Electrical Machine Lab*
- *Linear Control System Lab*
- *Modeling & Simulation Lab*
- *Power System Analysis Lab*
- *Power System Switchgear & protection Lab*
- *Testing & Commissioning of Electrical Machines Lab*

# Lab Facilities

## Electrical Engineering Research Laboratories

### Electrical Machine - (I &II) Lab –

*There are equipment's like single - phase step - up, step - down and isolation transformers, dc shunt, series motor, three phase induction motor, induction motor, dc generators, and various machines for performing various tests related with the specific machine.*



# Lab Facilities

## Electrical Engineering Research Laboratories

### Network Analysis Lab –



# Lab Facilities

## Electrical Engineering Research Laboratories

### Electrical & Electronics Engineering Lab –

*This lab is fully equipped with equipment like motors, generator (both A.C. & D.C), transformers, all measuring instruments (voltmeters, ammeters, watt-meters, and energy meters), rheostats, capacitors, and inductors, to conduct the experiments.*





# Lab Facilities

## Linear Control System Lab –

*The lab focuses on technical implementation issues of classical control theory in the frequency domain and modern control theory in the state - space.*



# Lab Facilities

## Renewable Energy Lab -

*This lab is used to develop clean energy and energy efficiency technologies and practices, advance related science and engineering, and provide knowledge and innovations to integrate energy systems at all scales.*



# Lab Facilities

## Power System Analysis Lab –

*In this Lab, Simpower System is used for modeling and analysis of Electrical Machine, FACTS Devices and Load flow Methods.*



# Lab Facilities

## Industrial Electronics Lab –

*This lab includes learning of Power semiconductor devices like IGBTs, Power MOSFETs, triggering circuits, and other devices for making and testing analog and digital circuits, Thyristor converters, DC chopper modules, Pulse transformers and other related commutating components.*





# Lab Facilities

## Power System Switchgear & Protection Lab –

*Protective relaying is a vital part of any electric power system: unnecessary during normal operation but very important during emergencies, faults, and abnormal disturbances. Power system Laboratory comprises protection, simulation, high voltage and machine related experiments. Facilities are available for over - current, under - voltage, directional, differential and distance relays including different numerical relays.*



## Smart Grid Lab -

*The Smart Grid Lab provides a structure that allows components and configurations to be tested in a flexible and dynamic way, enabling its customers to simulate real network conditions and study specific situations. Simulating different energy flows or fault conditions will help to understand which components to use and what choices to make to ensure the greatest accuracy possible when managing electricity distribution networks.*

# IET: Electronics and Communication Engineering



## Sample Faculty Members

- ✓ Devika Kataria, Ph.D. (IIT- Kanpur)
- ✓ Gustavo Sanchez, Ph.D. (Simon Bolivier), M.Tech. (Nancy, France; B. Tech. (Metz, France)
- ✓ Divanshu Jain, M Tech (BITS)

## Laboratories

- *Electronic Device & Circuits Lab*
- *Digital Electronics Lab*
- *Analog Electronics Lab*
- *Analog Communication Lab*
- *Digital Communication Lab*
- *Linear Integrated Circuit lab*
- *Digital Signal Processing Lab*
- *Microwave Engineering Lab*
- *Antenna & Wave Propagation Lab*

# Lab Facilities

## Electronics & Communication Engineering Research Laboratories

### Electronic Devices and Circuits Lab –

*This is the main lab where the research like device characteristics and basic analog circuits are done. The lab consist of oscilloscopes, function generators and power supplies. The research carry out which include the study of the characteristics of devices such as diodes, BJT, FET, Basic amplifiers, Oscillators and Waveform generators using electronic devices.*



# Lab Facilities

## Electronics & Communication Engineering Research Laboratories

### Digital Electronics Lab –

*This laboratory provides Hands-on experience in designing and implementation of digital logic circuits and systems. The laboratory experiments involve the design and testing of digital systems using small and medium scale integrated circuits.*





# Lab Facilities

## Analog Electronics Lab

*This lab is in continuation of electronic device and circuits (EDC) lab. Here, research is to perform on the different kind of amplifiers, oscillators, and frequency filters. There all are made using the properties of the components studied in EDC which are different transistors, diodes, inductors etc.*



# Lab Facilities

## Digital Communication Lab

*The objective of this lab is to understand the advanced digital Communication techniques and perform them on kits/ breadboard to consolidate basic knowledge in Digital Communication. This will cover the ASK, PSK, FSK, Probability of error, Noise, CDMA, FDMA and various other methods.*



## Digital Signal Processing Lab

*The purpose is to introduce the various digital signal processing techniques using MATLAB environment. The lab has more than 30 numbers of computers along with latest version of MATLAB which is a user friendly tool.*

# Lab Facilities

## Embedded-VLSI Lab

*Digital Embedded Systems Lab provides students with hands-on experience with building, programming, testing, and debugging processor and FPGA-based systems. We are engaged in research on architecture, design, and tools for networked and embedded computing and communication systems using Zybo Zynq-7000 Development Board, Nexys 4DDR artrix-7 FPGA Board and Xilinx Vivado Software. This lab is already offering application-specific training courses in Embedded Systems Technology and has further started functioning as a technology support centre for embedded systems based product development.*



# Lab Facilities

## Linear Integrated Circuits Lab

*The objective of this laboratory is the design of electronic circuits using linear integrated circuits and their applications in the processing of analog signals. The standard setup in the lab contains basic and advanced trainer kits, oscilloscopes and function generators. In addition to these experiments, different applications of timers, DAC and ADC are performed. In addition to above labs, research lab also have Microwave Engineering Lab and Antenna and Wave Propagation Lab.*





# Lab Facilities

## Optical Communication Lab

*To know and understand how communication is being established at microwave frequencies and using fiber in optical communication. This lab is used by the researchers to perform practical pertaining to the study of optical fiber communication using state of the art kits. The Lab in Fiber Optics provides the researchers with an experience on the various fiber optic and digital communication techniques.*



# Lab Facilities

## Microwave Engineering Lab

*This lab provides hands on with different microwave benches using reflex klystron, different waveguides, couplers, TEE's, horn antennas etc. this lab involves different measurement of microwave which works on high voltage with 300V DC at 10GHz frequency to work towards the design and analysis of microwave circuits, millimeter wave applications, phase shifters, and filters are some such components.*



# Lab Facilities

## Antenna and Wave Propagation Lab

*The objective of this laboratory to learn the basic concepts of different types of antenna and their measurement, RADAR and satellite Communication. This lab involves the practical of measurement of different antennas and application of RADAR and analog & Digital signal transmission using Satellite trainer. The standard setup in the lab contains basic and advanced trainer kits for RF design and Telecommunications classes.*



# IET: Mechanical Engineering



## Sample Faculty Members

- ✓ J.P. Naidu, Ph.D
- ✓ Ravishankar Prasad, Ph.D.
- ✓ Rajlakshmi Nayak, Ph.D. (IIT Madras)
- ✓ Deepika Mishra, M. Tech.
- ✓ Bhargav Prajwal Pathri, M.Tech. (Coventry University, U.K.), B.Tech. (MNIT)

## Laboratories

- *Workshop*
- *Strength of material lab*
- *Fluid Mechanics and Machinery lab*
- *Metrology Lab*
- *Machine tool lab*
- *Dynamics of Machines lab*
- *Machine Drawing & CAD lab*
- *Refrigeration & AIR Conditioning Lab*
- *Automobile lab*
- *Steam power Engineering Lab*
- *Heat transfer Lab*
- *Metrology Lab*
- *CFD Lab*



# Lab Facilities

## Mechanical Engineering Research Laboratories

### Workshop –

*The workshop have different sections of Foundry, Fitting, Welding, Carpentry and smithy which enable researchers to use various tools and processes for their research activities.*



# Lab Facilities

## Mechanical Engineering Research Laboratories

### Strength of Material Lab –

*The lab has equipped with –*

*Computerized Universal Testing Machine,  
Torsion Testing Machine,  
Fatigue testing Machine,  
Hardness Testing Machines.*

*The objective of this lab is to understand and  
measure various mechanical properties of the  
materials.*



# Lab Facilities

## Dynamics of Machine Lab –

*This lab has equipped with –*

- *Slider Crank and Crank Rocker Mechanism,*
- *Kinematics of Universal Joints,*
- *Kinematics Gears,*
- *Gear Train Experimental Setup,*
- *Governors Experimental Setup,*
- *CAM - Experimental Setup, Motorized gyroscope,*
- *Whirling of Shaft,*
- *Balancing of Reciprocating Masses,*
- *Balancing of Rotating Masses, and Vibration System*  
*- Spring Mass System.*



# Lab Facilities

## CNC Lab –

*The lab has equipped with –*

- *CNC Lathe Machine*
- *CNC Milling Machine*
- *CNC Turret Machine*





# Lab Facilities

## Steam Power Engineering Lab –

*The lab has equipped with –*

- *Working Boiler attached with Steam Turbine*



# Lab Facilities

## Refrigeration and Air conditioning Lab –

*This lab has equipped with refrigeration test rig, air conditioning test rig and a host of other equipments. The objective of this lab is to study window A/C, air washer, basic components of refrigeration and air-conditioning system and experiment on refrigeration test rig and air conditioning testrig.*



# Lab Facilities

## Automobile Lab –

*The lab has equipped with –*

- 2 stroke,
- 4 stroke petrol/ diesel engine,
- Gas turbine models,
- Petrol and diesel engine test-rig etc.

*The objective of this lab is to understand the working of petrol/diesel engine and analysis of experimental results. Other labs are Steam power Engineering lab, Renewable Energy, Heat Transfer, CFD labs and Metrology lab, Machine Drawing Labs (AutoCad, Creo).*



# Lab Facilities

## Machine Tool Lab –

*The lab has equipped with –*

- *Milling Machine,*
- *Shaper Machine,*
- *Lathe Machine,*
- *Gas and Arc Welding Machine,*
- *Rolling Machine,*
- *Mould making and Casting,*
- *Sand Testing,*
- *Injection Moulding etc.*





# Lab Facilities

## Fluid Mechanics and Machinery Lab –

*The lab has equipped with a variety of flow measuring devices venturimeter, weirs, notches, orifice meters and couple of equipments for flow study techniques for estimating losses in pipes, study of impact of jets over vanes etc. The Machinery lab is equipped with Pelton Wheel, Francis Turbine, Reciprocating Pump, Centrifugal Pump, Hydraulic Ram etc. The objective of this lab is to understand the function of various experiments, analyze the results and draw the performance curves.*



# Polymer and Rubber Testing Lab supported by JK Tyre & Industries Ltd.

**JK LakshmiPat University recently received three high end research equipment from JK Tyre:**

1. Perkin Elmer Thermogravimetric Analyzer (to determine thermal degradation temperature profile of the polymers and rubber samples),
2. Waters Gel Permeation Chromatography (to determine the polydispersity index and molecular weight of polymers)
3. Waters Mass Spectrometer (to determine the purity of rubber compounds).

