

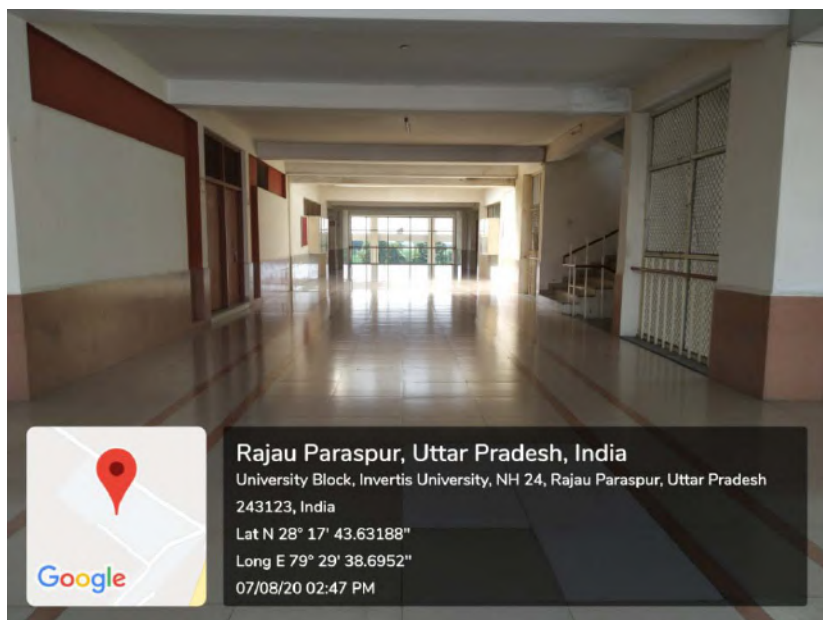
3.1.5 INSTITUTION HAS THE FOLLOWING FACILITIES TO SUPPORT RESEARCH

Name of the facility	Year of establishment
Central Instrumentation Centre	2015
Business Lab	2016
Research / Statistical Databases	2018
Moot Court	2012
Theatre	2012
Central Fabrication facility	2013

Invertis University, Central Instrumentation Facility



Invertis University has set up the Central Instrumentation Facility with the primary objective of supporting the research activities of its faculty, Ph.D scholars and Postdoctoral researchers. Excellence in teaching needs sophisticated equipments and support facilities. These equipments and facilities help the faculty, research scholars and students to carry out their research in basic and applied sciences. The facilities house a wide range of sophisticated analytical and fabrication equipment, maintain them and ensure a fair utilization among the research community. The facilities are envisaged to nourish collaborative research between Invertis University and other academic and Industrial organizations. Some of the equipment that are installed and operational. support multi- disciplinary research areas like material sciences, bio sensors, organic photovoltaic and other emerging frontier fields. To cater the need of researchers in different areas, the Central Instrument Facility (CIF), was established at the Invertis University, Bareilly in the year 2015 with the support from the university fund. The CIF, Invertis University houses sophisticated analytical instruments which are operated and maintained by a dedicated and qualified group of Scientists and Engineers. The division supports in-house operation and maintenance of various sophisticated scientific instruments. The division also provides services to the outside users like industries, universities and research laboratories against minimal charges.



Central instrumentation facilities consist of instruments in the areas of:

Name	Make/Supplier
PCR (THERMAL CYCLER)	Applied Biosystems 2720
FLUORESCENCE MICROSCOPE	METER OPTICAL AC 220 V
LIGHT MICROSCOPE	Coslab Model VN - 7
HOT AIR OVEN	COSLAB
MICROPROCESSOR BASED pH METER MODEL 1010	ESICO
DIGITAL pH METER	EI
GEL ROCKER SHAKER	MEDOX
BOD INCUBATOR	TANCO
DEEP FREEZER (-20°C)	Bulestar
SAMSUNG FREEZER 254L	SAMSUNG
MAGNETIC STIRRER HOT PLATE	COSLAB
HEATING MANTLE	TANCO
Western blotting	Jaipur scientific instrument
ELISA READER	ALERE,USA
Power Pack	Jaipur scientific instrument
HORIZONTAL GEL ELECTROPHORESIS	edvotek
CENTRIFUGE	Remi
WEIGHING BALANCE	jaipur scientific instrument
Haemoglobinometer	Jaipur scientific instrument
Haemocytometer -	Jaipur scientific instrument
BOD INCUBATOR	Tanco

Heating mantle-1	Tanco
Centrifuge	Remi
U.V transilluminator	Medox
Laminar Air Flow	Tanco
Vortex Mixture	Remi
Autoclave	Tanco
Water bath	Tanco
Burette stand	Jaipur scientific instrument
Micropipette variable (100- 1000μl), (10- 100μl) (2- 20μl)	Himedia
Water distillation Unit	Jaipur scientific instrument

About Instruments :

PCR (Thermal Cycler)

Applied Biosystems 2720

The thermal cycler is a laboratory apparatus most commonly used to amplify segments of DNA via the polymerase chain reaction. Thermal cyclers may also be used in laboratories to facilitate other temperature-sensitive reactions, including restriction enzyme digestion or rapid diagnostics



HPLC (High Pressure Liquid Chromatography)

High-performance liquid chromatography (HPLC; formerly referred to as high-pressure liquid chromatography) is a technique in analytical chemistry used to separate, identify, and quantify each component in a mixture. It relies on pumps to pass a pressurized liquid solvent containing the sample mixture through a column filled with a solid adsorbent material. Each component in the sample interacts slightly differently with the adsorbent material, causing different flow rates for the different components and leading to the separation of the components as they flow out of the column.



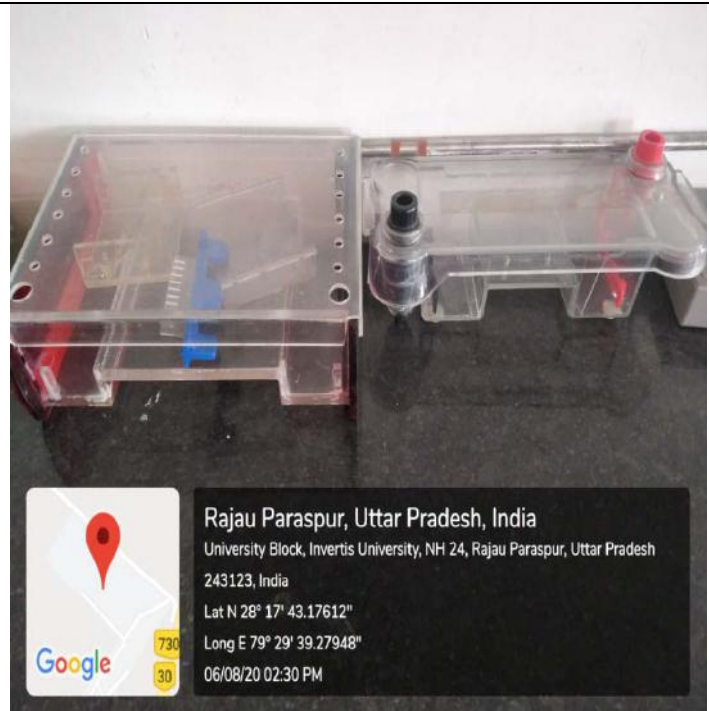
ELISA Reader, ALERE, USA

A microplate reader is a laboratory instrument that is used to measure chemical, biological or physical reactions, properties and analytes within the well of a microplate. A microplate consists of small wells in which separated reactions take place. These reactions convert the presence of an analyte or the progression of biochemical processes into optical signals. The microplate reader detects these signals and thus quantifies the parameter of interest.



Horizontal-Gel Electrophoresis Unit

Also called submarine **units**, are systems designed to run agarose or polyacrylamide **gels** submerged in running buffer. Samples are introduced to an electric field and will migrate to the anode or cathode depending on their intrinsic charge.



Gel Rocker Shaker

These gel rocker shakers are efficiently used in various laboratories and testing labs for biological mixing applications which creates waves in various liquids. A rocker or shaker is likely to be found on the bench top of most laboratories whether small, large, academic, clinical or commercial. These important tools are used for a variety of applications including cell culture, DNA extraction, low foaming agitation, mixing reagents, and staining gels and blots.



UV-Visible Spectrophotometer

Ultraviolet-Visible spectrophotometer refers to absorption spectroscopy or reflectance spectroscopy in part of the ultraviolet and the full, adjacent visible spectral regions. This means it uses light in the visible and adjacent ranges. The absorption or reflectance in the visible range directly affects the perceived color of the chemicals involved.



Dissolution Tester

In the pharmaceutical industry, drug dissolution testing is routinely used to provide critical information. Thus, the dissolution testing which is conducted in a dissolution apparatus must be able to provide accurate and reproducible results. This test is designed to determine compliance with the dissolution requirements for solid dosage forms administered orally.



Fridge

Laboratory refrigerators are used to cool samples or specimens for preservation. They include refrigeration units for storing blood plasma and other blood products, as well as vaccines and other medical or pharmaceutical supplies.



Digital pH Meter

A pH meter is a scientific instrument that measures the hydrogen-ion activity in water-based solutions, indicating its acidity or basicity expressed as pH. The pH meter measures the difference in electrical potential between a pH electrode and a reference electrode, and so the pH meter is sometimes referred to as a "potentiometric pH meter". The difference in electrical potential relates to the acidity or pH of the solution. The pH meter is used in many applications ranging from laboratory experimentation to quality control.



UV Transilluminator

When stained with ethidium bromide, the gel is viewed with an ultraviolet (UV) transilluminator. The UV light excites the electrons within the aromatic ring of ethidium bromide, and once they return to the ground state, light is released, making the DNA and ethidium bromide complex fluoresce. Standard transilluminators use wavelengths of 302/312-nm (UV-B), however exposure of DNA to UV radiation for as little as 45 seconds can produce damage to DNA and affect subsequent procedures, for example reducing the efficiency of transformation, *invitro* transcription, and PCR.



Autoclave

An autoclave is a machine used to carry out industrial and scientific processes requiring elevated temperature and pressure in relation to ambient pressure/temperature. Autoclaves are used in medical applications to perform sterilization and in the chemical industry to cure coatings and vulcanize rubber and for hydrothermal synthesis. Industrial autoclaves are used in industrial applications, especially in the manufacturing of composites. Many autoclaves are used to sterilize equipment and supplies by subjecting them to pressurized saturated steam at 121 °C (250 °F) for around 15–20 minutes depending on the size of the load and the contents



Ultrasonic Waterbath

Sonicator

Degassing and defoaming of liquids is an interesting application of ultrasonic devices. In this case the ultrasound removes small suspended gas-bubbles from the liquid and reduces the level of dissolved gas below the natural equilibrium level.



Weighing Machine

Weighting Scales are used to measure the weight of an item. The LAB scale is a high-precision analytical balance with a measuring range of up to 0.1 mg to 220 g.



Hot Air Oven

Hot air ovens are electrical devices which use dry heat to sterilize. They were originally developed by Pasteur. Generally, they use a thermostat to control the temperature. Their double walled insulation keeps the heat in and conserves energy, the inner layer being a poor conductor and outer layer being metallic.



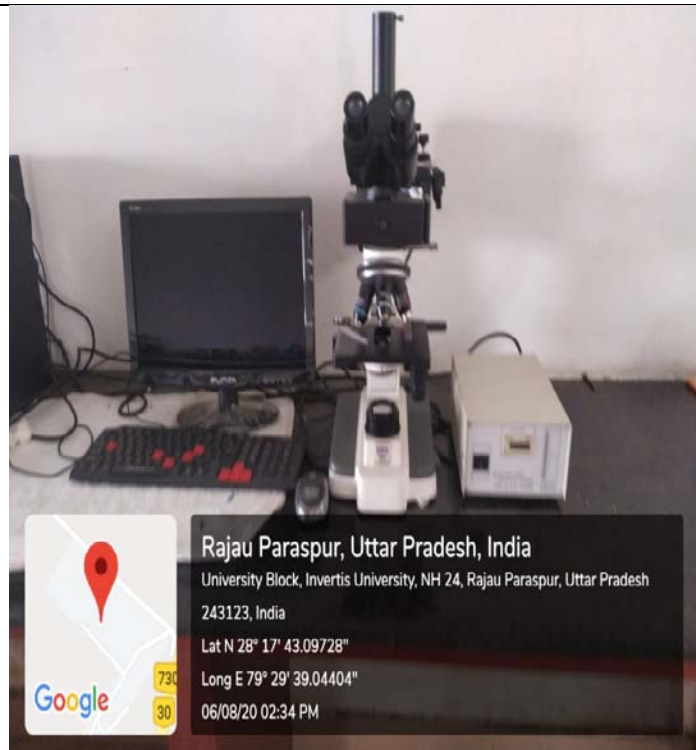
Light Microscope

The optical microscope, also referred to as a light microscope, is a type of microscope that commonly uses visible light and a system of lenses to generate magnified images of small objects. Optical microscopes are the oldest design of microscope and were possibly invented in their present compound form in the 17th century. Basic optical microscopes can be very simple, although many complex designs aim to improve resolution and sample contrast. The object is placed on a stage and may be directly viewed through one or two eyepieces on the microscope.



Fluorescent Microscope

A fluorescence microscope is an optical microscope that uses fluorescence instead of, or in addition to, scattering, reflection, and attenuation or absorption, to study the properties of organic or inorganic substances. It generates an image, whether it is a more simple set up like an epifluorescence microscope or a more complicated design such as a confocal microscope, which uses optical sectioning to get better resolution of the fluorescence image.



BOD Incubator

BOD Incubator is Biological Oxygen Demand incubator and it is widely used in microbiology laboratories for the applications that include cell culture and fungal growth, BOD test, fermentation, crop and physiology and various pharmaceutical tests etc. It is also known as low temperature incubator or **refrigerated incubator** because it is made with temperature range between 5°C to 60°C or with cooling and heating functions under one unit.



Laminar Air Flow Chamber

A laminar flow cabinet or tissue culture hood is a carefully enclosed bench designed to prevent contamination of semiconductor wafers, biological samples, or any particle sensitive materials. Air is drawn through a HEPA filter and blown in a very smooth, laminar flow towards the user. Due to the direction of air flow, the sample is protected from the user but the user is not protected from the sample. The cabinet is usually made of stainless steel with no gaps or joints where spores might collect. Such hoods exist in both horizontal and vertical configurations, and there are many different types of cabinets with a variety of airflow patterns.



Vortex Mixer

A **vortex mixer**, or **vortexer**, is a simple device used commonly in laboratories to mix small vials of liquid. It consists of an electric motor with the drive shaft oriented vertically and attached to a cupped rubber piece mounted slightly off-center. As the motor runs the rubber piece oscillates rapidly in a circular motion. When a test tube or other appropriate container is pressed into the rubber cup (or touched to its edge) the motion is transmitted to the liquid inside and a vortex is created. Most vortex mixers are designed with 2 or 4-plate formats, have variable speed settings ranging from 100 to 3,200 rpm, and can be set to run continuously, or to run only when downward pressure is applied to the rubber piece.



Table Top Centrifuge

A **laboratory centrifuge** is a piece of laboratory equipment, driven by a motor, which spins liquid samples at high speed. There are various types of centrifuges, depending on the size and the sample capacity. Like all other centrifuges, laboratory centrifuges work by the sedimentation principle, where the centripetal acceleration is used to separate substances of greater and lesser density.



Centrifuge

Centrifuges work by the sedimentation principle, where the centripetal acceleration is used to separate substances of greater and lesser density. Centrifuge rotors have tremendous kinetic energy during high speed rotation. Rotor failure, caused by mechanical stress from the high forces imparted by the motor, can occur due to manufacturing defects, routine wear and tear, or improper use and maintenance. Such a failure can be catastrophic failure, especially with larger centrifuges, and generally results in total destruction of the centrifuge.



Deep Freezer(-20°C)

Laboratory Deep freezers play important role in safe storage of reagents, frozen vaccines and other temperature sensitive specimens for research purposes that require freezing temperature up to -20 degree.



Incubator

A laboratory incubator is a heated, insulated box used to grow and maintain microbiological or cell cultures. The incubator maintains optimal temperature, humidity and gaseous content of the atmosphere inside.



Soxhlet Apparatus

It is the most useful apparatus for solid-liquid extraction.

In environment pharmaceuticals in various fields such as & foodstuffs Nowadays, also Soxhlet apparatus is still common and widely used as a reference and standard method in many laboratories for the extraction of oil from various materials.



The usage of central instruments was initiated in the month of September, 2015. Many of the basic equipments were procured before concept of CIF to initiate the research in the campus.

Interested Researchers/Faculty/Students/Industries can avail the facility for their academic, research activities.

Business Lab / Studios

Invertis University, Bareilly to achieve excellence in the field of education established a business lab for its undergraduates as well as post graduate students in the field of Management and Commerce.

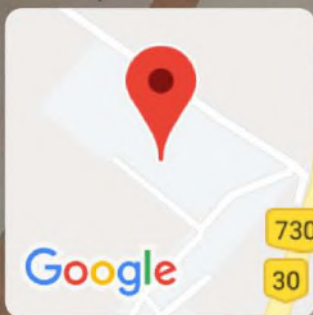
This lab is established to accomplish the goal and mission of University of overall personality development of students, University does not believe in only bookish knowledge but tries to create such kind of atmosphere which develops overall personality of its students to meet the challenges of life and career ahead, for the same business lab is established for which will help in inculcating the application part of theory.

This lab will help the purpose of making the students understand the practical implications of the theory subjects which they are studying in class and how this theory is practically implemented.

Students will learn in this lab in the form of various activities like, role plays, quiz, case study competition, simulation games, Strategy games, Supply chain management games, formal presentations, product launches etc.

Such practical activities will create an interest in students towards their classes and they will in actual learn the implementation part of all the things which they are studying in class.

This lab will definitely solve the purpose of making learning easier and fun for students.



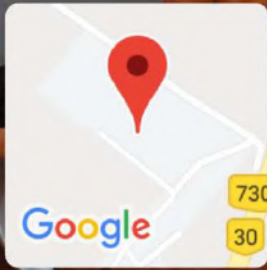
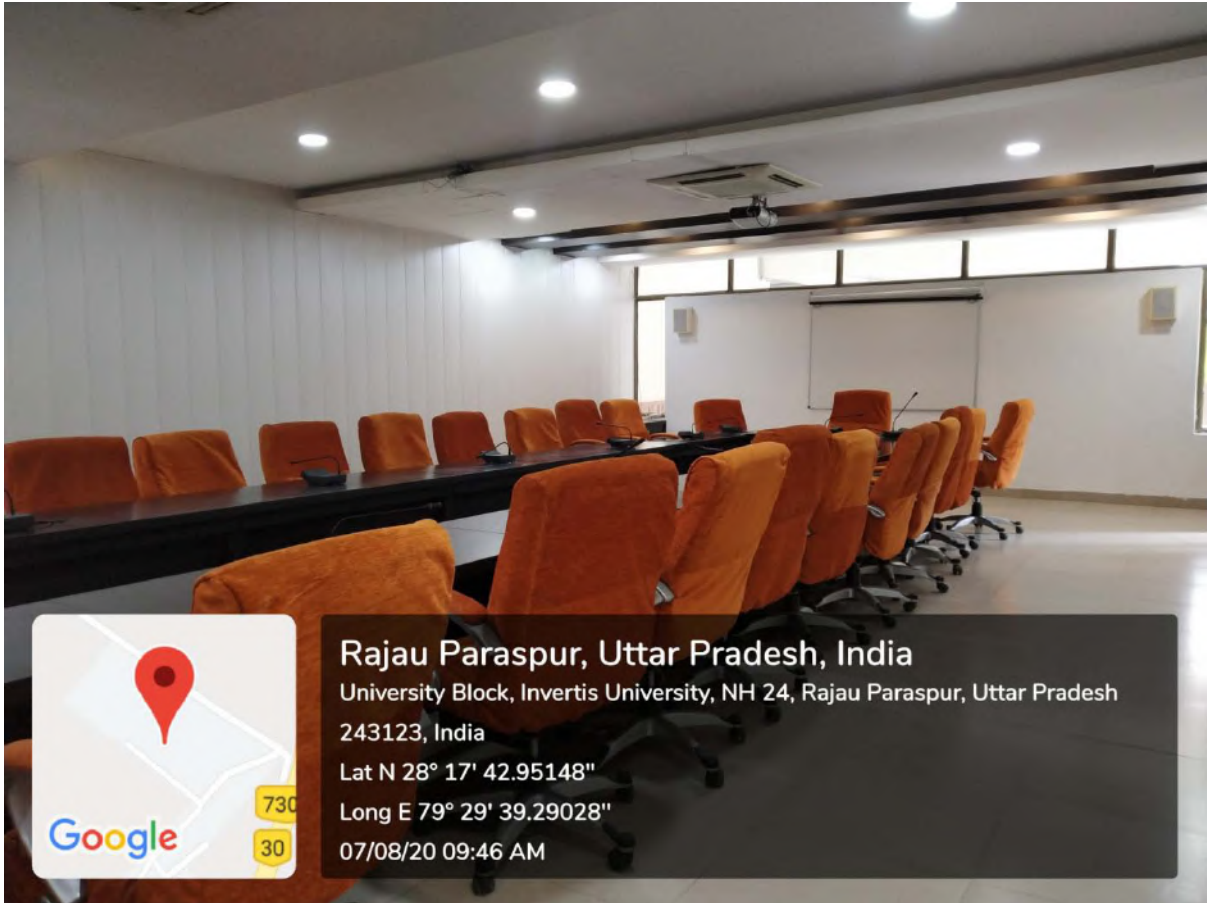
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University Block, Invertis University, NH 24, Rajau Paraspur,
Uttar Pradesh 243123, India

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243123, India

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243123, India

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Research/Statistical Database

The Invertis University is providing the ideal platform for scientists, researchers and academicians to transform their ideas into success and develop their potential. Over the years the research efforts have expanded to include sponsored research and consultancy projects in multiple disciplines like Science, Engineering, Technology and Management. Research scholars are conducting research in different areas like **business analysis, marketing behaviour, economic**. So, it is very important that scholars must have appropriate methods and tools to carry out research. If research involves data analysis, then you need a good statistical research tool for research work. We have also a good plagiarism checking software to avoid academic misconduct. University has access to EBSCO database for research scholars. EBSCO host provides several subscribed databases which provide access to newspapers, magazines, scholarly journals and trade publications. Its databases cover multiple subjects and academic disciplines.

Microsoft Excel

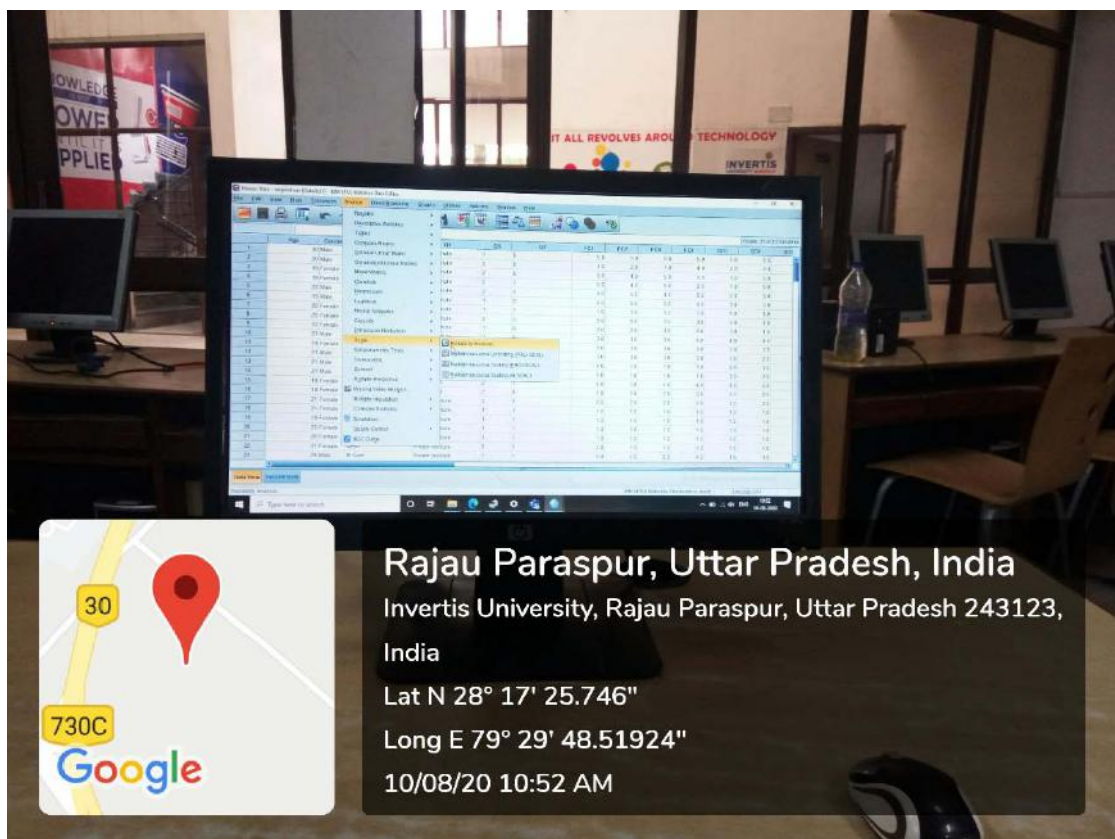
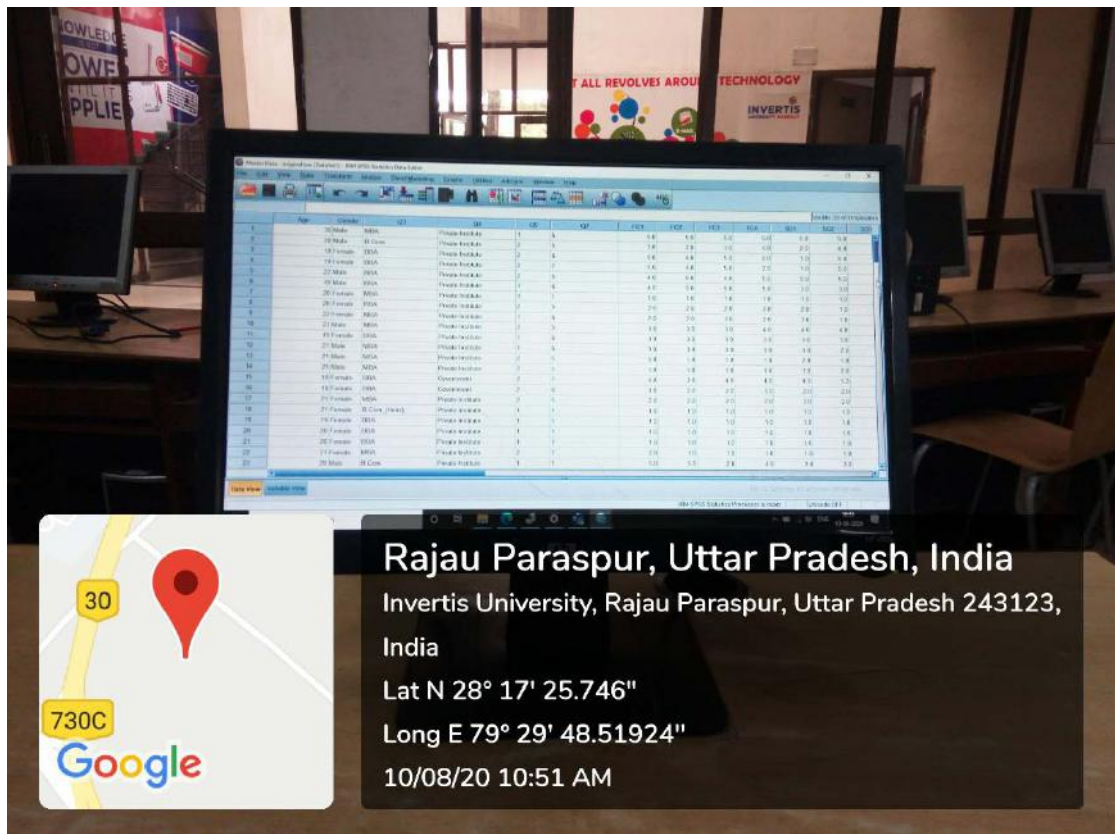
Microsoft Excel is one of the widely used tools for research. MS Excel has plenty of features that will come in handy for researchers to add something new to the existing set of knowledge. Excel offers a wide range of statistical functions as well as variety of chart types for quantitative analysis. Data analysis ToolPak Excel add-in options is available in this software for complex statistical analysis like Descriptive statistics, correlation, linear regression, different type test etc.

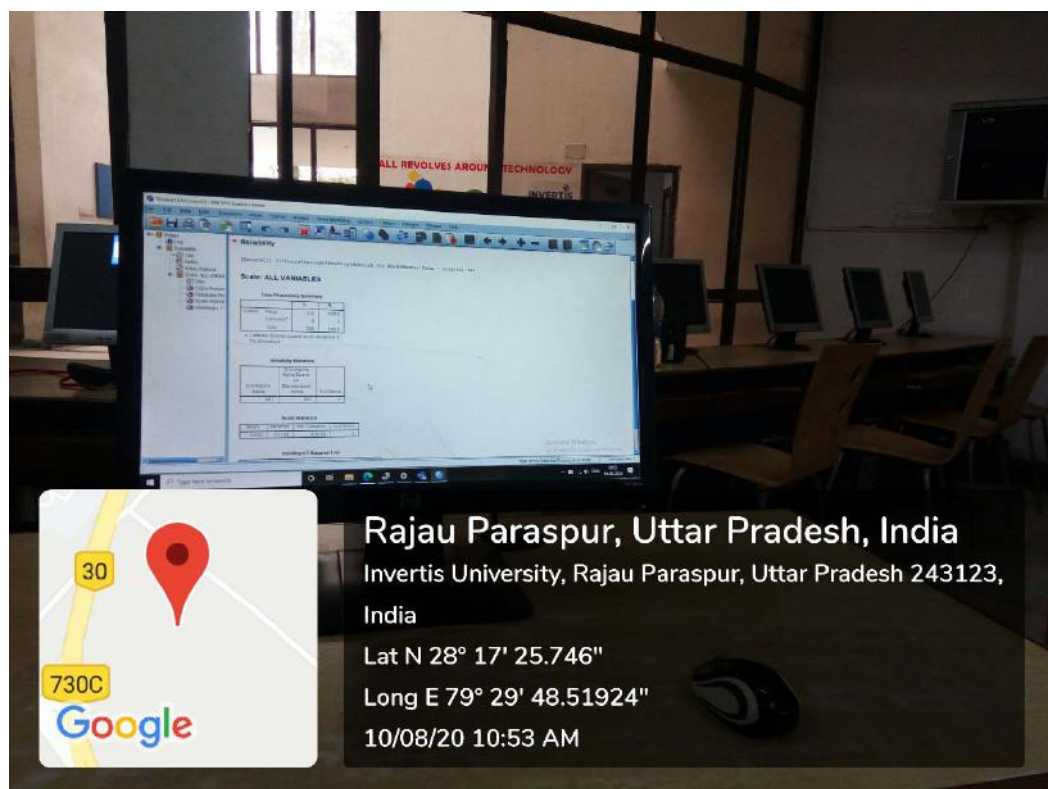
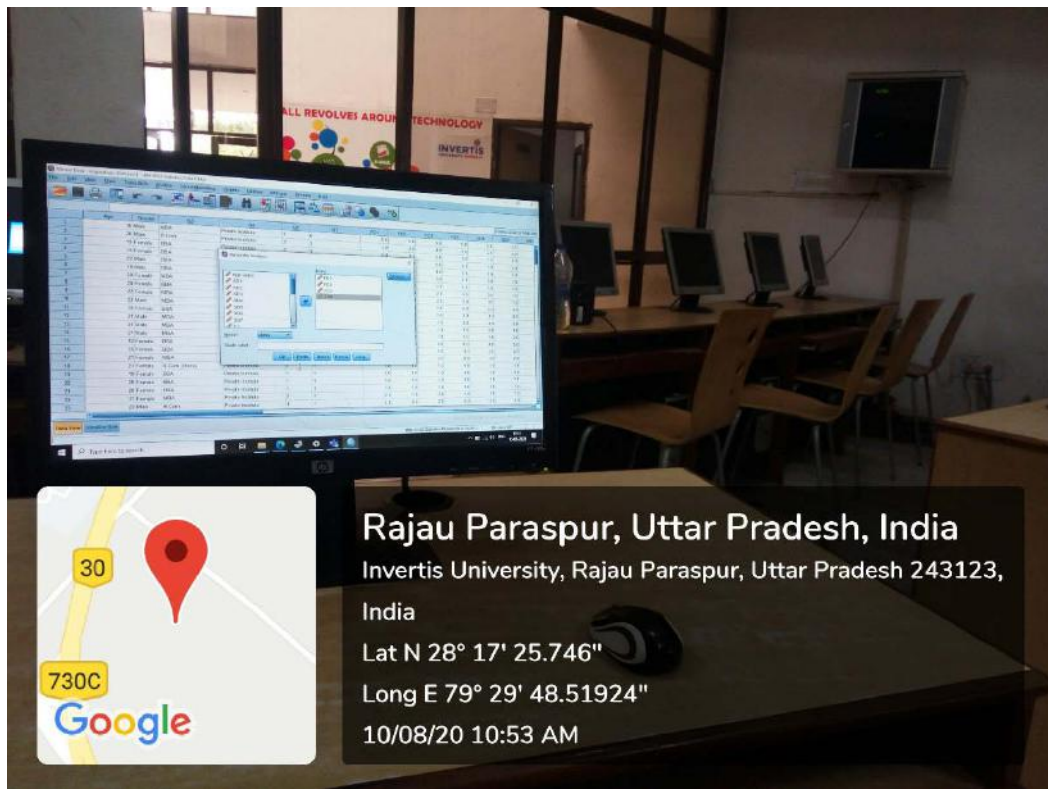
Statistical Package for Social Science (SPSS)

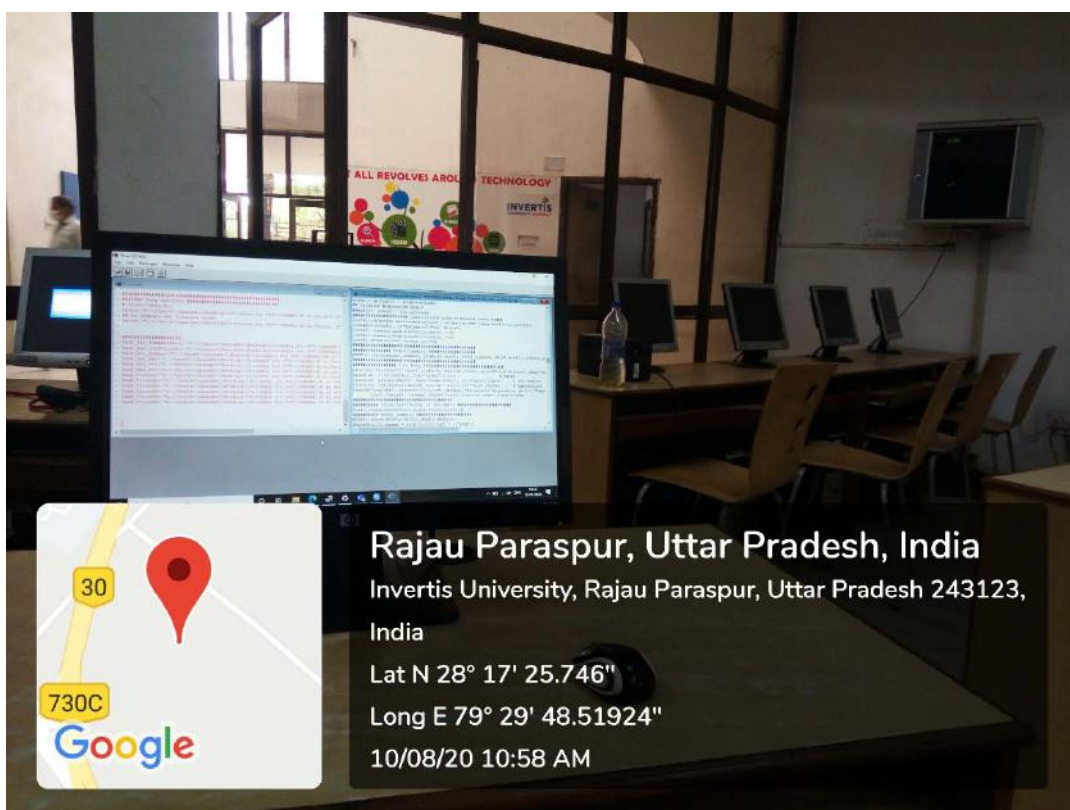
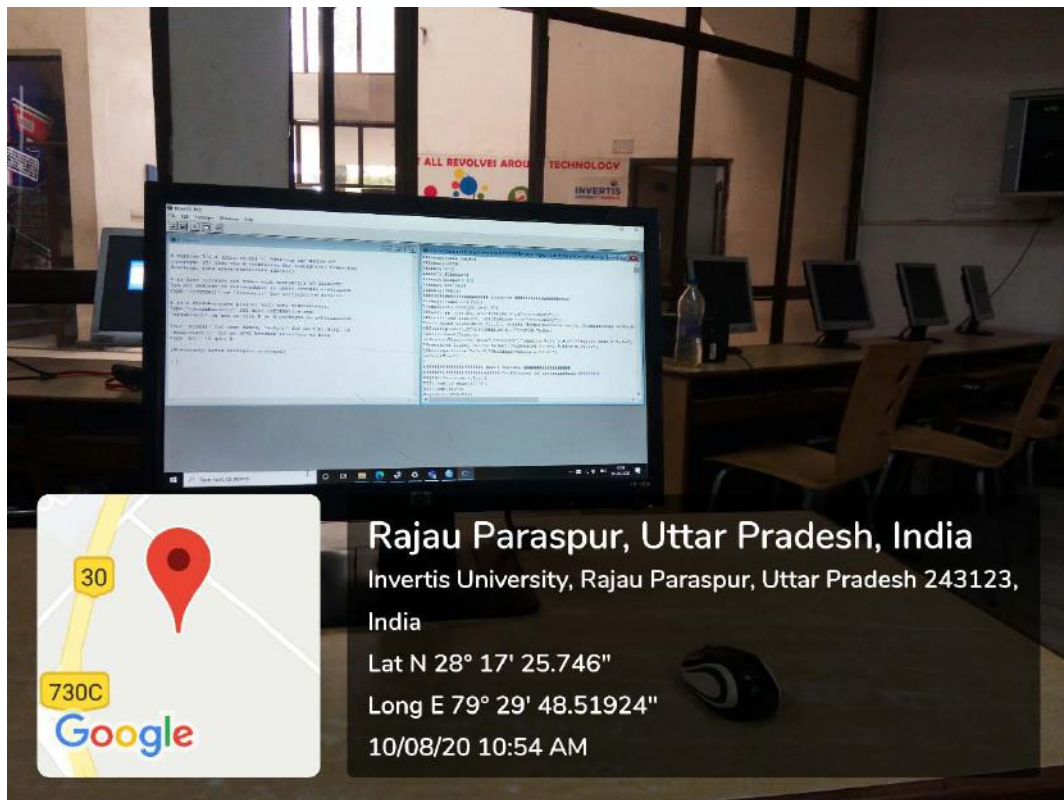
Statistical Package for Social Science is a powerful statistical software platform. It is a Windows based program which is used to perform different tasks like, data entry, analysis and further presentation of results through tables and graphs. Researcher used this software to conduct the various operations like Data Transformation, Data Examination, Descriptive statistics, reliability test, correlation test, Regression test, Hypothesis testing, ANOVA, MANOVA, Dimension reduction and many more.

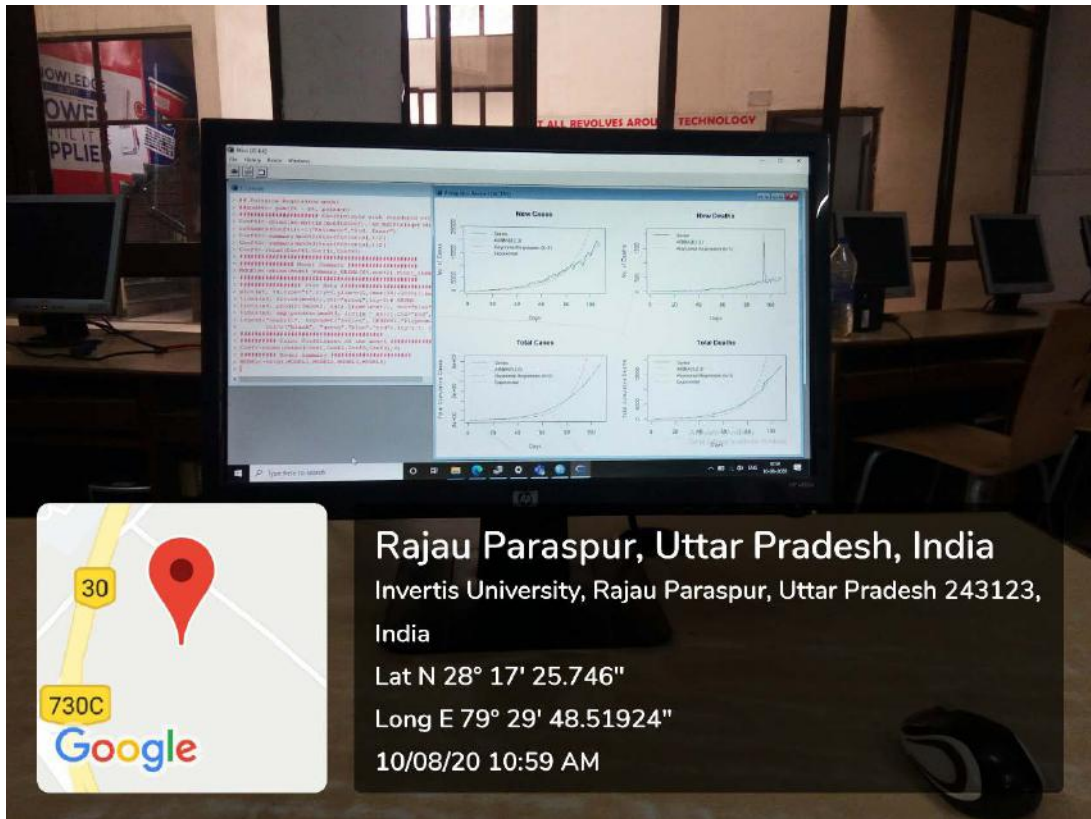
R Software

R software is a programme-based software for data analysis. R software provides a wide variety of statistical (linear and nonlinear modelling, classical statistical tests, time-series analysis, classification, clustering, etc.) and graphical techniques, and is highly extensible for the researcher. This software provides an Open Source route to participate in that activity. R can be extended (easily) via packages as per researcher's requirement.



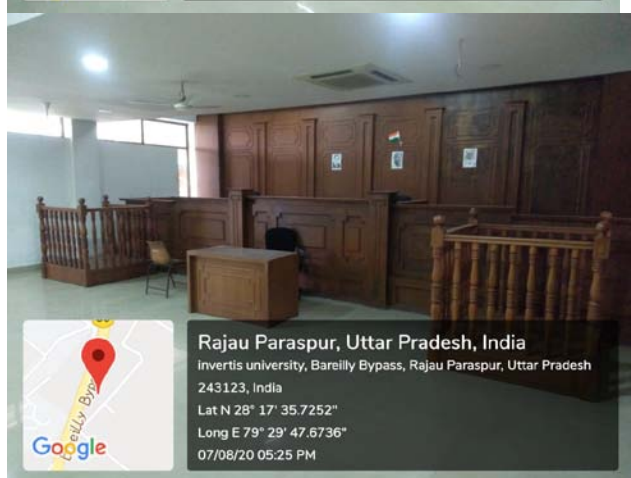
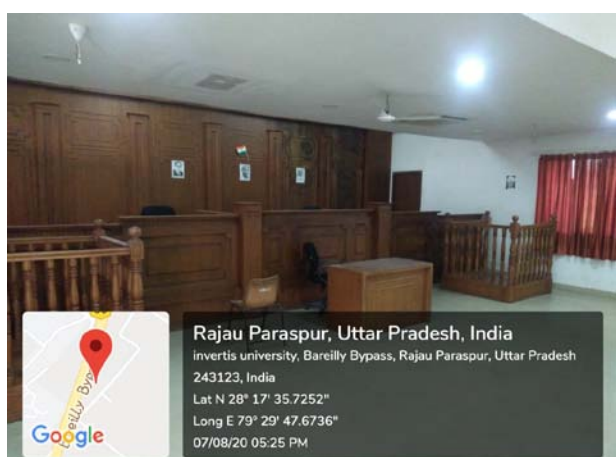






Moot Court

Moot court is one of the key extracurricular activities of the department of law at Invertis University. Moot Court is dummy advocacy, where students act as if they are arguing a case before the court. For that purpose we have a Moot court Room. Several teams of students are made and they have to prepare the case from both the sides and submit a memorial for that and then two teams argue with each other on the points of law. There are judges who are to decide as who was the better speaker and which was the best team. Various Intra departmental and inter university moot courts are organised regularly at the Invertis University campus and also there are dedicated lectures and practical classes of moot court for the students. Competing in moot court competitions provides an opportunity for students to build advocacy skills, sharpen public speaking skills, and engage in legal research in a variety of areas of law. The skills are not only beneficial for future advocates but the ability to speak persuasively and sharpened legal research skills invaluable in all types of legal careers.





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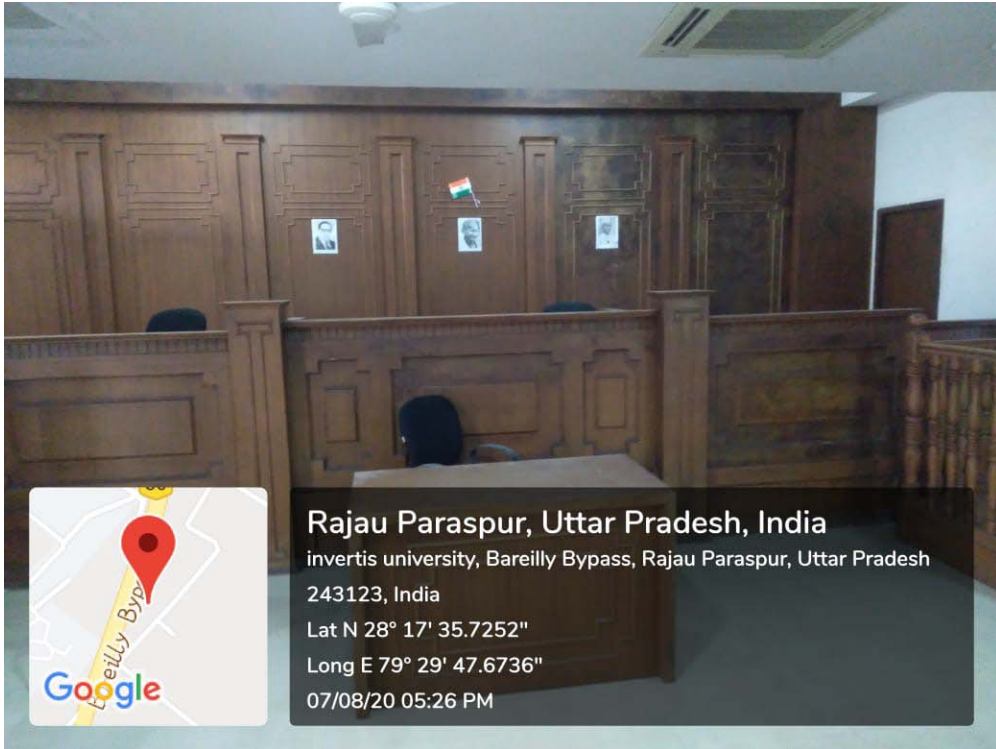
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THEATER

‘A theater major is your ticket to every corner of the theater world.’ Theater majors study plays and other dramatic works and their production. Classes cover such topics as theater history, playwriting, acting, and directing, as well as lighting, scenery, and costumes.

Aristotle was born in 384 BC, but his thoughts on drama have been at the heart of writing curricula pretty much since that time. In poetic, he wrote that drama (specifically tragedy) has to include 6 elements: plot, character, thought, diction, music, and spectacle.

5 REASONS WHY THEATRE IS STILL IMPORTANT

Theatre helps us to see a different perspective from our own. We’re shown humanity, psychology, motivations, conflict and resolution. We as the audience get to witness the trajectory of persons other than ourselves. As artists, we put ourselves into emotional and intellectual situations that may never arise in our personal lives. Theatre promotes us to give power to truth, to take risks and to advocate for new and diverse voices.

Theatre reminds us that we are not alone. Not only are we sharing space and an experience with the artists who are performing, we are sharing the experience with fellow audience members. Movies and television don’t have the same intimacy or sense of participation. Sharing an experience with live actors and live audience members is not only valuable, it’s necessary for human connection.

Theatre is immediate, evolving and always different. Although the script may be the same every night, the performance is unique, each and every time it happens. No two performances are ever the same. In this way, everyone involved has a distinct and unique experience that can never be replicated.

Live theatre helps to promote social discourse, dialogue and potential social change. Theatre is a cultural phenomenon that demands that society examines itself in the mirror. We can study societal problems and attempt to find solutions. Coming together as a community to listen to opposing points of view is necessary.

Theatre promotes education and literacy. Studies have shown that students who participate in theatre do better in school.

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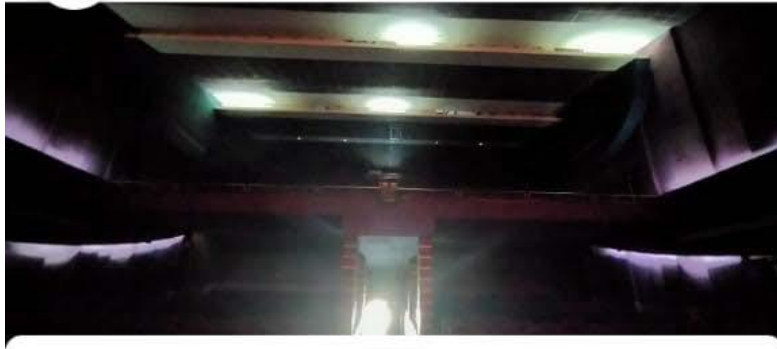
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CENTRAL FABRICATION FACILITY

CENTRAL FABRICATION UNIT

To translate the science into technology, Invertis University, Bareilly has created an educational platform, Central Fabrication Unit. The university offers wide support to students through centralized fabrication unit along with the departmental labs.

There are various accommodations/shops with well-furnished tools, equipment's and machineries (like lathe, drilling machine, welding machine, punching machine, fitting vice and tools, carpentry tools, sheet metal work, foundry etc.) to aid the students to fabricate their experimental set-up, products to patent, national level competitions, journal publications, sponsored research and consultancy etc. separately from lab hours with the obligatory quality and quantity within the time. Not only this, but the fabrication unit provides a support to all of the student's research, academic projects (minor or major projects of B. Tech. and M. Tech) and assist the college in infrastructure fabrication works also.

A number of facilities are also available to manufacture the components, repair and service of the parts. Following facilities are available in the Central fabrication unit for the students:

1. Foundry Shop
2. Blacksmith Shop
3. Fitting Shop
4. Carpentry Shop
5. Sheet Metal Shop
6. Machine Shop
7. Welding Shop
8. Metrology section

CENTRAL FABRICATION UNIT



Figure 1 Central fabrication unit

Foundry Shop

In foundry shop students can produce castings of their own projects. Patterns for the casting are prepared in the carpentry shop from wood. Metals to be casted are melted in the furnace and then poured in already formed cavity of required shape, after solidification the product is taken outside by breaking the mould. The most common materials processed in the foundry shop are Aluminium.



Figure 2 Foundry Shop

Blacksmith Shop

Metals are shaped in Blacksmith shop in cold and hot working stages. Most of the mild steel structures are fabricated at this facility. Students develop the structures steel for automotive designs and other project related works. A number of forging techniques are available in this shop for the students.



Figure 3 Blacksmith Shop

Fitting Shop

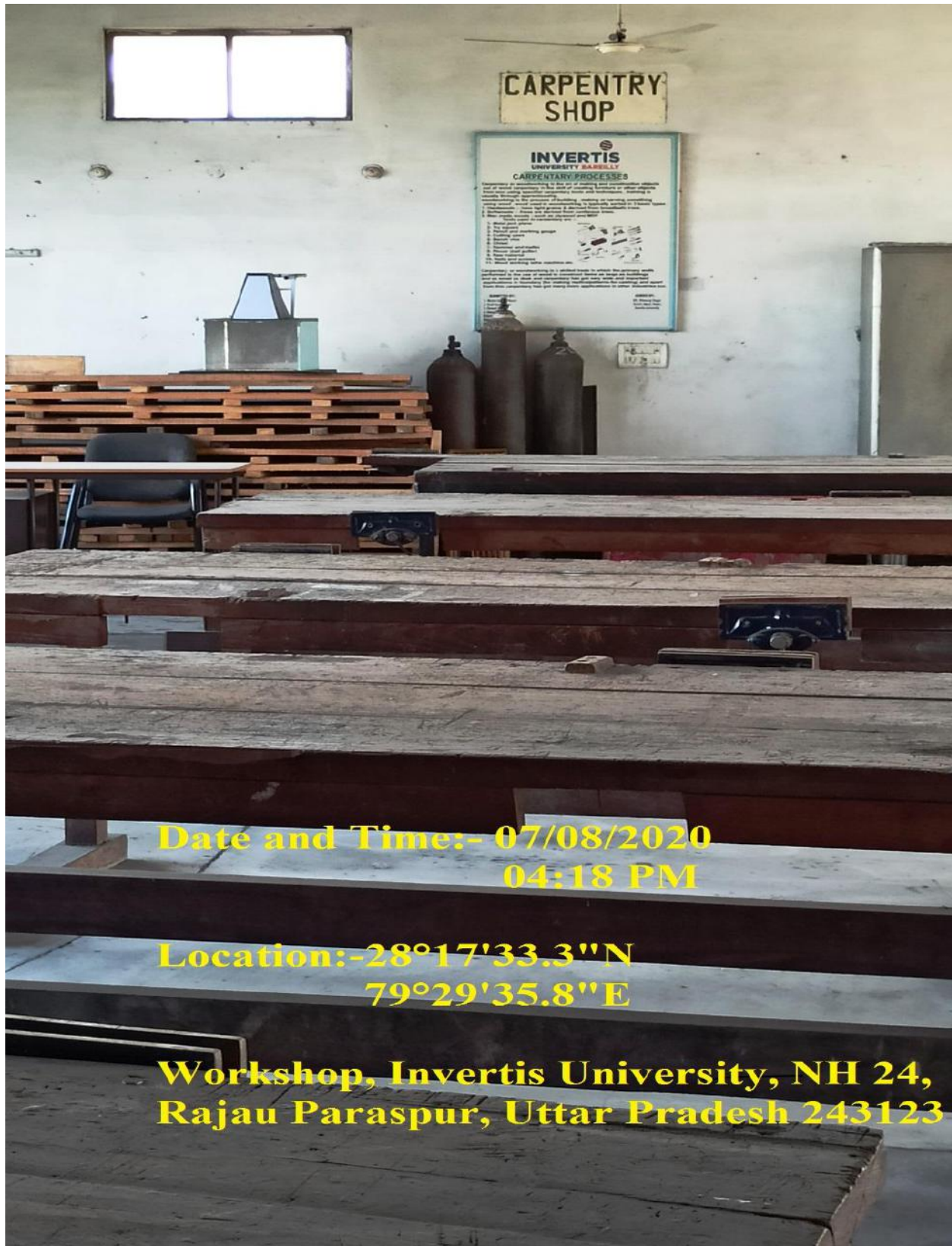
In fitting shop, assembly of different parts with required fit is prepared. A number of activities are done by the students to prepare the assembly such as selection of various tools for holding, marking, sawing, filing, drilling and fitting. Moreover, students can create a product through the given technical drawing by using appropriate engineering tools and equipment's in fitting shop.



Figure 4 Fitting Shop

Carpentry Shop

Number of facilities such as wood working, wood cutting, shaping, pattern making, repairing of wooden structures are provided in the carpentry shop. Students can design different types of patterns according to their requirement in the project (and other assignment). This is one of the important shops for the students.



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**Workshop, Invertis University, NH 24,
Rajau Paraspur, Uttar Pradesh 243123**

Figure 5 Carpentry Shop

Sheet Metal Shop

Sheet metal shop helps the students in preparing minor and major projects involving sheet metal operations like sheet metal bending, trimming, and shaping the sheets to their desired shapes. Some of the examples of sheet metal works are making of hoppers, canisters, guards, covers, pipes, hoods, funnels, bends, boxes etc.



Figure 6 Blacksmith Shop

Machine Shop

Machine shop is one of the important and most valuable shops for the engineering students where they can apply the theoretical knowledge into the real world tangible solutions. This shop offers engineering students a well-furnished and safe environment to work where the manufacturing of model of projects using various machine tools and cutting tools can be prepared by the students. The shop contains a number of machine tools like lathe, drilling machine, hacksaw, shaper etc.



Figure 7 Machine Shop

Welding Shop

In this shop joining of various parts is done to fabricate a structure. The facilities of gas and electric arc welding are available in this shop. The Welding shop provides students to construct and/or repair metal structures and equipment using different types of welding like gas welding, electric arc welding. Students can also perform gas cutting in this shop. Students in this shop attain skills during welding with industrial safety measures.



Figure 8 Welding Shop

Metrology section

After fabricating the models/projects; students use the metrology section instruments to check the dimensions of the models and ensure the accuracy. The metrology section consists of highly advanced instruments. Students can ensure a number of quality parameters in the object produced like dimensional accuracy for accurate results as per Indian standards.



Figure 9 Metrology Section