**Facilities and Services offered by the Department of Geology**

1. **Thin Section/Petrographic Laboratory**

This laboratory hosts state of art facilities for the impregnation, cutting, grinding and polishing of the rock thin sections.

**Available Equipments:**

1. METKEN Forcipol 2V Grinder and Polisher, thin section cut off and Trim Machine Vaccum Impregnation unit and Hot Plate.

**Usage:**

Thin section preparation for the sedimentological and biostratigraphic analysis.

1. **Sedimentology/Biostratigraphy Laboratory**

The sedimentology/Biostratigraphy laboratory is providing training and promoting a good practice in the field of hydrocarbon exploration in particular, and in the exploration of other economic mineral deposits in general. These services are promoting the awareness, application and technology used in the field of sedimentology/Biostratigraphy and disseminating to a wider scientific community, thereby contributing to the economic competitiveness of the country.

Following Laboratory equipment are available at the University of Peshawar.

1. **Scanning Electron Microscope (SEM)**
2. Scanning Electron Microscope: 200KV Transmission Electron Microscope (JM 2100, JEOL, Japan) with EDX, (INCA100/Oxford instruments, UK)
3. OKV Scanning Electron Microscope (JSM5910, JEOL, Japan) with SEI and EDX detectors (INCA200/ Oxford Instruments, UK)

**Usage:**

1. Define the mineralogical composition using (whole rock and clay).
2. Digenetic history and identification of potential reservoir facies and their distribution and para-genetic sequences for better hydrocarbon reservoir characterization.
3. Determination of porosity and permeability of the outcrop samples and/or core plugs.
4. Identification of the micro and nano fossils for Biostratigraphic/Palynostratigraphic analysis.
5. **X-ray Diffractometer (JDX 3532, JEOL, Japan) with CuK (Alpha) Source**

**Usage:**

1. Define the mineralogical composition using XRD analysis (whole rock and clay).
2. **Digital Camera fitted (DPX 12)Olympus (BX 41) Polarizing Microscope**

**Usage:**

1. For the detailed petrography using thin section/polished sections to identify/elaborate, microfacies analysis (skeletal grains, mineral phase and cement etc.), facies logs/profile which can be used for the prediction of the depositional environments/Sequence stratigraphic modeling.
2. Identification of different cements/porosity types/diagenetic fabric of the rocks for better hydrocarbon reservoir characterization.
3. Identification and photomicrography of the larger and smaller benthic foraminifera, planktonic foraminifera, spores, pollens, dinoflagellates etc. for the biostratigraphic/palynostratigraphic analysis of the outcrop/well samples.
4. **Centirfuges (upto 10,000 RPM)**

**Usage:**

1. It is used in the maceration process of the palynomorphs sample preparation whereby the organic microfossils are separated from the heavy mineral matter.
2. **Ultrasonic Bath**

**Usage:**

1. It is used for the ultrasonic cleaning of the extracted micro-and nanno fossils
2. **Sieve sets (10-350 Micron size)**

**Usage:**

1. It is used for the separation of microfossils and particle size for the detailed Sedimentological/Biostratigraphic analysis.
2. **Chemicals and glass wares:**

**Usage:**

1. All essential chemical (acids, heavy salt solutions) and glassware are available for the palynostratigraphic/biostratigraphic and geochemical analysis of the outcrop/ditch/core samples.
2. **STRUCTURAL GEOLOGY LAB.**

The structural laboratory has high processing work stations equipped with advanced Structural Geology and other geology related Software which include the following;

* 1. **Move Suite 2014 Including;**
     1. 2-D Move for Seismic interpretation and making geological cross-sections
     2. 3-D Move for creating subsurface 3-D Models using multiple structural algorithms and 3-D Model Balancing
     3. MOVE Main for Cross-section balancing, Forward Modeling, Fracture modeling, Geo-Cellular volumetric Analysis, Sediment modelling, Stress analysis, Hydrocarbon migration Path analysis, Move link to Petrel and Move link to OpenWorks R5000
  2. **Interactive Petrophysics 4.2 (IP)**
     1. It is being used for advanced Petrophysical analysis using different wireline data logs
  3. **Setreographic** Interpretation facility of folds and faults
  4. **3D Aerial Photograph** viewing facility

1. **GIS and Remote Sensing lab.**

Our GIS/RS lab. is equipped with High Tech. computers installed with high performance dedicated 3D GPUs to run the heavy graphics and satellite imagery smoothly and efficiently and the computers have the following Mapping related software;

1. **ArcGIS 10.0**

**Usage:**

* 1. This version of ArcGIS has been improved remarkably in terms of its data processing ability where it can process the data to a detail of a Milimeter without hanging-up which was the major problem in ArcGIS 9.3 or earlier versions which is why our lab. was upgraded to ArcGIS 10.0
  2. The remote sensing tools are much more enhanced and LIDAR image processing tools have been introduced

1. **Global Mapper 15.0**

**Usage:**

* 1. It is used in our lab. as a bridge to shift between different file formats
  2. It is also preferably used for geo-referencing and rectification of Geological maps and images
  3. DEM interpretations and also done using this software

1. **Google Earth Plus**

**Usage:**

* 1. This is the paid version of Google Earth which is used in our labs. to view high resolution imagery which is not usually available in the free version of Google Earth

1. **CorelDraw Graphic Suite 16**

**Usage:**

* 1. Although Digitization of maps is done using the ArcGIS 10.0 but CorelDraw is used to take the final outputs keeping in view the resolution and smoothly toned image output qualities of this software

1. **Surfer**

**Usage:**

* 1. It is rarely used when the image stacking is required to run the remote sensing jobs efficiently