SYLLABUS FOR THE SUBJECT OF GEOLOGY

PAPER - I

Total Marks: 100

**Physical Geology:** Earth as a member of the solar system; its origin, age, composition and internal structure. Geomorphic processes

**Structural Geology:** Physical properties of rocks and rock behavior in different tectonic environments; deformation by fracturing and folding; interpretation of linear and planar elements.

**Paleontology:** Paleontological principles and techniques and their application to the evolution of life, the ecological structure of ancient biological communities, and the history of the earth.

**Stratigraphy and Sedimentology:** Principles of stratigraphy; Stratigraphic record and nomenclature, Geological time scale, Stratigraphy of Salt Range. Origin, transportation and deposition of sediments; biostratigraphic dating and correlation; Sedimentary processes and environments.

**Mineralogy/ Petrology:** Crystal chemistry; crystal growth and mineral genesis, physicochemical principles governing crystal structures. Mineralogical, chemical, textural, and structural properties of igneous, metamorphic and sedimentary rocks; their origin and relations to evolution of the Earth crust and mantle including rocks of both the continents and ocean basins.

**Geochemistry:** chemical processes involved in the development of the earth and distribution of the elements in the earth’s crust, atmosphere and ocean. Physical chemistry of soils including soil mineralogy (formation, relative stability, ion exchange properties) and surface chemistry. Principles of thermodynamics. Application of thermo chemistry to high and low temperature processes.
Earth Resources: Fossil fuels, Nuclear mineral resources, Renewable energy resources, hydropower and geothermal energy, Water cycle, Surface water, Ground water, construction materials including those for concrete and aggregate, sand gravels, cement making and building stones; Fundamentals of Metallogeny and plate tectonics with reference to Pakistan. Uranium and strategic metals.


Remote Sensing and GIS: Introduction to the filed of remote sensing. Earth satellite systems for remote sensing. Applications in geological mapping, mineral prospecting, structural geology, geohydrology, engineering geology and geomorphology. Principles of geographic information system (GIS) including an overview of data structure, data types, methods of data analysis and cartographic modeling.


RECOMMENDED BOOKS