BACHELORS WITH GEOLOGY AS MINOR (CT – I)
5th SEMESTER

GLY522N GEOLOGY _ GEOCHEMISTRY AND GEOPHYSICS

CREDITS: THEORY:3, PRACTICAL:1

OBJECTIVE/EXPECTED LEARNING OUTCOMES

This course deals with extracting geological information out of geochemical and geophysical datasets. The student will acquire skills to use various geochemical, and geophysical methods and basic principles of radioactivity for age determination the composition and age of rocks, and mineral exploration.

UNIT -1 (15 HOURS)

Introduction to geochemistry: Crystal chemistry-chemical bonds, coordination number, radius ratio, ionization potential, electro-negativity, atomic substitution, phase rule. Cosmic abundance of elements. Chemical differentiation and composition of the Earth. Major elements, Trace elements and Rare earth elements, Large ion lithophile elements and High field strength elements.

UNIT-2 (15 HOURS)

Goldschmidt's geochemical classification of elements. Geochemical characteristics of crust, mantle and core. Geochronology and Age of Earth. Relative and absolute dating techniques for age determination. Radioactivity and concept of half-life, decay constant, natural radioactive isotopes.

UNIT-3 (15 HOURS)

Introduction and scope of geophysics, Spheroidal shape of the earth and Geoid, the magnetic field of the earth, paleo-magnetism, Exploring Earth's interior. Applications of geophysics in mineral and energy resources exploration. Earth's thermal history: Heat conduction and heat flow. The thermal gradient of the earth. Convection currents-evidence. Gravity measuring instruments: Pendulum gravimeters, Shipborne measurements. Units of gravity, gravity anomaly - definition, types (Free- air, Bouguer), local and regional concepts

PRACTICAL (1 CREDIT: 30 HOURS)

Types of geochemical data analysis and interpretation of common geochemical plots.

BOOKS RECOMMENDED

- Miall, A. D., 1999: Principles of Sedimentary Basin Analysis. Springer-Verlag.
- Pettijohn, F. J., Potter, P.E. and Siever, R, 1990: Sand and Sandstone. Springer Verlag.
- Reading, J. G. 1996: Sedimentary Environment and Facies. Black well.
- Selley, R. C., 1976: Introduction of Sedimentology. Academic Press, London.
- Selley, R. C., 1976: Introduction of Sedimentology. Academic Press, London.
- Sengupta, S., 1997: Introduction to Sedimentology. Oxford-IBH.
- Collinson, J. D, 1999: Sedimentary Structures. Springer Verlag.
- Einsele, G., 1992: Sedimentary Basins. Springer Verlag.
- Friedman, G. M. and Sander, J. E., 1978: Principles of Sedimentology. John Wiley. 0
- Krishanan, M. S., 1968: Geology of India and Burma. Higginbothams Pvt. Ltd., Madras.
- Albarede, F., 2003: Geochemistry - An Introduction, Cambridge.
- Gunter, F., 1991: Principles and Applications of Inorganic Geochemistry, Prentice Hall.
- Marshal, C. P. & Fairbridge, R. W., 1999: Encyclopaedia of Geochemistry, Kluwer Academic.
- Moore M. 1982: Principles of Geochemistry, Wiley.