CBSC Syllabus for B.Sc Geology 1st Semester effective from academic session 2016

Course No.	Course	Course Name	Credit	Total Credits	Marks	Internal	External
Semester First							
GL-T1	**Theory**	**Fundamentals of Geology**	**4**	**6**	**100**	**30**	**70**
GL-P1	**Practical**	**Field Work; Crystallography and Mineralogy**	**2**		**50**	**20**	**30**
Semester Second							
GL-T2	**Theory**	**Petrology**	**4**	**6**	**100**	**30**	**70**
GL-P2	**Practical**	**Igneous & Metamorphic Petrology**	**2**		**50**	**20**	**30**

Note: Lectures per week: 4 of one hour each and Practical per week : 2 of three hours each

B. Sc First Semester

Course (GL-T1): Fundamentals of Geology (Theory=4 Credits)

Unit-I

Introduction to the science of geology: Definition, branches, scope and importance, History of Geology; Modern theories about the origin of solar system; Evolution of continents and oceansRelation with other branches of sciences; Role of physics, chemistry and paleobiology in the development of ideas about earth. Role of Physics in crystallography, gravity, geomagnetism, isostasy, earthquakes and microscopy. Role of Chemistry in chemical bonds, crystal chemistry, solution chemistry, chemical energetics.

Unit-II

Introduction to rocks and minerals: Rocks as natural mineral aggregates; types of rocks: igneous rocks; sedimentary rocks; metamorphic rocks. Preliminary knowledge about the most common rock forming and economic minerals Physical properties and chemical composition of the earth and earthôs crust. Geology as the history of Earth: How the rocks record history _ (a) Fossils (b) Mineralogy and thetexture; (c) Structures; (d) Palaeogeography, Paleoclimate. Surface relief of the earth. Exogenous and endogenous process. Various Geospheres: Atmosphere; origin and evolution; structure, composition and energy balance; Heat budget; Ocean; origin and evolution; ocean circulation and its role in global climate.

Unit-III

Crystallography: Introduction to crystallography, geometrical nature of the order of crystals. Translation vectors, planar and space lattices. Normal class of crystal systems. Morphology of crystals: Face, edge and solid angle, interfacial angle and Law of constancy of interfacial angles. Axial system and axial ratios. Parameter system of Weiss, Miller indices. Law of Rationality of indices. Crystal growth and twining: Growth of crystals from solutions and from a melt under controlled conditions, crystal growth in open fractures, solution cavities and vesicles. Twining in crystals: Types, causes and laws Crystal forms: Crystallized, crystalline, cryptocrystalline and amorphous. Crystal habit: elongated, tabular, flattened and equant. Form of crystalline and cryptocrystalline aggregatesï types, examples and use in mineral identification. Crystal chemistry: Dimorphism, polymorphism, pseudomorphism, isomorphism and solid solution.

Unit-IV

Mineralogy: definition, scope and classification of silicate minerals and ore forming (oxide/ sulphide) minerals. Scalar and vector properties of minerals; Mohoôs scale of hardness. Physical properties and the mode of occurrence of the following groups of minerals: Quartz, Feldspar, Mica, Amphibole, Pyroxene, Olivine, Garnet, Chlorite, and Carbonate. Mineral optics: Elements of optics. Optics of isotopic medium _ refractive index, Snellôs law of critical angle, anisotropic media. Polarization and interference of light.Polaroid, polarizing microscope-construction and use.Use of accessory plates.Pleochroism and Birefringence. Optical indicatrix: isotropic, uniaxial and biaxial indicatrix. Optical properties of minerals under plane-polarized and cross-polarized light: Forms, cleavage, fractures and parting, refractive index and relief, Becke line and its use.

GL-P1 (Practical=2 Credits)

Field Work: Study of landforms, erosional and depositional features. Handling of Clinometer and Brunton compass for Measuring dip and strike, and plotting of field data on toposheets. Crystallography & Mineralogy: Demonstration of space lattice, model-Galena, Fluorite, Sphalerite, Pyrite and Calcite. Clinographic projection of the following crystals form: Cube, Octahedron, Zircon, Beryl, Calcite and Gypsum. Study of the physical properties of important rock-forming minerals as included in the theory paper. Study of optical properties of important rock forming minerals as included in the theory paper. Clinographic projections of the following crystals forms: Cube, Octahedron, Zircon Beryl, calcite and Gypsum.

Suggested Readings:

Holmes, A., 1996: Principles of Physical Geology, EUBS, Chapman. Judson, S. and Kaufman, M. E., 1990: Physical Geology, Prentice Hall. Press, F. and Seiver, R., 1989: The Earth, W. H. Freeman. Terrly, G. W., 1958: Principles of Petrology, Mathuen. Tarbuck, E. J. and Lutgens, F. K., 1997: Earth Science, Prentice Hall. Lutgens, F. K. and Tarbuck, E. J., 1998: Essentials of Geology, Prentice Hall. Gribble, D. D., 1988: Rutleyôs Elements of Mineralogy, DBS Publications. Kerr, P. F., 1984. Optical Mineralogy. Phillips, Wm, R. and Griffen, D.T., 1986: Optical Mineralogy. CBS Edition. Putnis, A., 2001: Introduction to mineral Science. Cambridge University Press.Putnis, A., 1992: Introduction to mineral Science. Cambridge University Press. Richard, V. G., 1997: Danaôs new Mineralogy. John Wiley.