COURSES OF STUDIES FOR Ph. D. COURSE WORK, 2012

There shall be four papers. Full Marks of each paper is 100 marks. Paper I and II will have five units each, each unit carries 20 marks. Paper III is Review of literature and paper IV will cover two seminar presentations.

Paper- I : Research Methodology

Unit - 1 Study of ore textures and their uses in interpretation of ore genesis and in terms of mineral processing, mineral liberation and optimum grinding size in mineral upgradation. Rock deformation, π – Pole and β-diagrams; their construction and application.

Unit-II Groundwater management; Groundwater pollution and mitigation; Groundwater resource estimation. Estimation of Ca, Mg, Na, K, CO_3, HCO_3, SO_4, Cl, Fe and F in water samples.

Unit- III Applicatioin of coal petrography in carbonization and hyrogenetion. Estimation of moisture, ash, volatile matter , fixed carbon, C, H, N and S of coal. Crossing Point Temperature of coal, Preparation of thin and polished sections of coal sample.

Unit- IV Application of micropaleontology in different fields of oil exploration, climate study and stratigraphy; Boundary currents in ocean. Stratigraphic problems with special reference to Orissa. Sequence stratigraphy, chrono and magnetic stratigraphy.

Unit-V Petrographic calculation: Norm, Osam, Niggli, Principles and applications of spectrophotometer. Flame photometer and AAS, XRF,XRD,SEM, ICP-MS, DTA-TG.

Paper – II – Computer and statistical application in Geology

Unit- I Statistical application in Geology

Computation of Ist and 2^{nd} degree equations of bivariate data and test of their statistical significances, computation and test of significance of correlation coefficient, cluster analysis. Dendograms and their significance. χ^2, F and t tests of geological data.

Unit-II Environmental Geology:

Environmental impacts by mining. Groundwater extraction. Environmental impact assessment. Remote sensing and GIS: their application in various fields, GPS.

Unit-III Ore Genesis:

Sedimentary exhalation, bacteriogenesis, volcanogenic massive sulphides, depositional environments of oxides and sulphides. Ore minerals under reflected microscope, Preparation of polished section and thin sections.

Unit- IV Computer application in Geology

Application of Computer: M.S. Office, Drawing of Pie chart, Histrograms from geological data, Statistical application of geological data by computer. Corel draw, Photoshop, Surfer.

Unit- V Mineral exploration:

Geological, geophysical, geochemical prospecting. Plate tectonics and ore deposits. Prospecting of various mineral deposits of India.