Dean, Faculty of Sc. P.U. Forwarded V.C. Secy 19/7/13

DEPARTMENT OF GEOLOGY
PATNA UNIVERSITY

Ph. D. Course work in Geology
(2013-14)

PAPER - I : Research Methodology

Unit 1: Theory and Philosophy of Research Methodology in context to Earth Sciences.

Unit 2: Theory of Sampling / field methods, Parametric Analysis and Quantitative and Qualitative methods in Geosciences.

Unit 3: Fieldwork/Laboratory Component
Theory of Analytical Methods, Practical training, Lab visit and Analysis of samples.

PAPER II : Geology

Unit 1: Recent Developments in Earth Sciences:
New concepts, New techniques, Global status, Research funding and overview of major international research projects and teams in the area of research. Current Issues and needs in Geosciences.

Unit 2: Candidate may choose any one of the following groups:

A. **Regional Metamorphism:** Problems of regional metamorphism illustrated by Precambrian basement terrenes and more recent orogenic belts. Review of experimental work in metamorphic mineral stability and recrystallization.

B. **Mineralogy:** Laboratory aspects of R.I. determination, model analysis, reflectivity, micro-hardness, cathodo-luminescence, chemical and X-ray analysis and their application in natural mineral systems and assemblages.

C. **Sedimentology:** Selected topics in depositional environments, tectonic control, diagenesis, and petrology of clastic and chemical sedimentary deposits.

D. **Stratigraphy & Palaeontology:** Stratigraphic sequence, depositional framework, and historical geology of India and contiguous areas. Techniques in micro and mega palaeontology, Emphasis on the principles of exploration for petroleum, ground water, and economic mineral deposits.

E. **Petrology:** Modern work in pure and applied petrology, including recent developments in research methodology and instrumentation concerning the investigation of crustal inorganic and/or organic matter.

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F. **Structural Geology:** Relationships between internal and external stress and the resultant strain features in rocks, including mathematical analysis and analog computer studies.

G. **Geochemistry:** Modern work in pure and applied geochemistry, including elemental distribution and migration in igneous, sedimentary, and metamorphic rock; hydrocarbon occurrence and organic studies; agricultural and medical aspects.

H. **Precambrian Geology:** The Precambrian geological record, and petrological, chemical and tectonic evolution of the crust and mantle. Special emphasis will be placed on Indian Archaean and Proterozoic record.

I. **Quaternary Geology and Geomorphology:** Evolution of land forms in the context of tectonics and climate, various techniques used in study of Quaternary record understanding the Quaternary deposits of India.

J. **Paleomagnetism and rock magnetism:** application, methods in palaeomagnetism and rock magnetism.

K. **Hydrogeology:** aquifers, types of aquifers, modern methods of characterization of aquifers, water chemistry and its implication in monitoring the groundwater quality.

L. **Environmental Geology:** Current environmental issues viz. water, soil contamination issues, causes, remedial measures. Geological hazards, seismicity, landslides, causes, mitigation, land use planning development. Use of Remote Sensing and GIS in the preparation of hazard zonation maps.

Unit 3: Literature Review/Project/Assignment work on any current topic of demand in the stream decided by the Supervisors and presentation report and work.

19/7/13

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