

University of Pune
Ph. D. Course work in Geology
2010-11

Each Course will be of 5 Credits and equally assessed for internal and external

PHD GEO 101: Research Methodology (5 Credits)

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

Sciences (1 Credits)

Unit 2: Theory of Sampling / field methods, Parametric Analysis and Quantitative

and qualitative methods in Geosciences. (2 Credits)

Unit 3: Candidate may choose any one of the following options –

Option I: Parametric, Statistical and Standard graphical, GIS and Remote sensing methods in Geosciences.

Option II: Mineralogical, Petrological and Geochemical Methods in Earth Sciences.

Option III: Geophysical Methods in Earth Science.

Option IV: Structure, Tectonics, Quaternary Geology and Geomorphology and modern methods of mapping, GPS Geodesy.

Option V: Hydrogeology, Theory and Methods.

Option VI: Concepts, Methods and Issues in Environmental Geology, Geotechniques, Disaster mitigation.

Option VII: Concepts, Methods in Mega and Micro Palaeontology and Stratigraphy (2 Credits)

PHD GEO 102: Advances in Geosciences (5 Credits)

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 of the candidate. Integrative approaches in Geology and Geophysics, Current Issues and needs in Geosciences. (1 Credit)

Unit 2: Candidate may choose any one topic out of following (2 Credit)

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

Advanced 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.

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

Regional Problems in 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.

Recent Advances in 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.

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

Recent Advances in 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.

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.

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.

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

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

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.

(2 Credit)

PHD GEO 103: Fieldwork/Laboratory/ Component/across the discipline credit course (5 Credits)

To be decided by the Supervisor/Departmental Committee. Theory of Analytical Methods to be used by the candidate (decided by Supervisor), Practical training, Lab visit and analysis of samples. Credit will be granted on the basis of the presentation of two (2) departmental seminars (5 Credits)

PhD Comprehensive Exam

Students registered in a PhD program must complete the course work within 6 months of beginning the program. The candidate's supervisory committee will examine the students knowledge in the area(s) of Geology related to the student's research. Students will submit a comprehensive research proposal which will form the basis for the oral examination.