

SYLLABUS
of
Ph.D Course in Geology
(For research students admitted in 2011-2012 batch onwards)
General Paper
PAPER-I: RESEARCH METHODOLOGY IN GEOLOGY

UNIT-I

Defining the Research problem, objectives, approaches, planning or design, process/methods of research, literature survey, ethics in research, plagiarism, consequences of plagiarism, intellectual property rights, copy right regulations and patents.

UNIT-II

Geological surveying, Geological mapping and field work with igneous, sedimentary and metamorphic rocks. Use of topographic maps, air photographs and remote sensing images for geological mapping. Instruments - compass, GPS in geological mapping. Sub-surface geological surveying, mine- surveying, study of data from drilled holes, well-logging.

UNIT-III

Methods of sampling and analytical techniques - collection of air, water, soil and rock samples. Preparation of samples for microscopic examination and chemical analysis. Analytical techniques - AAS, XRF, ICP, EPMA and Mass Spectrometry. Precision, accuracy, detection limits and standards.

UNIT-IV

The writing process- Stages of writing-planning, generating ideas, stating the thesis, publishing research findings: language skills for writing scientific articles, preparation of manuscript, format of research paper, submission in hard copy and online submission for the journals. Elements of citation, citation methods, list of references, writing projects proposals, presentation of research findings - visual, oral, poster preparation, power point presentation. Designing illustration - tables, figures, graphs, charts, photographs, and geoscientific maps.

REFERENCES:

1. Kothari, C.R., Research Methodology-methods and techniques, Vishwa Prakashan-2004.(Unit-I)
2. Corray, P.G., 1992. Guide to scientific and technical writing, Hindagala, Sri Lanka.
3. Srinivasa Rao.K., 2004. Geoscientific writing- a guide to language and composition styles. Memoir 58, Geo. Soc India. Banglore.(Unit-IV)
4. Manual of field Geology by Robert R. Compton Wiley Eastern Pvt.Ltd,New Delhi 1968. (Unit-II)
5. Field Geology by F. H. Lahee CBS Publishers& Distributors 1978 (Unit-II).
6. Rollinson, H.R.(1992)Interpreting Geochemical Data:Evaluation, Presentation and Interpretation.352pp.
7. Davis, G.B. and C.A. Parker Writing the doctoral dissertation. Barrons Educational series, 2nd edition, 1997, 160.
8. Duncary, P. Authoring a PhD, thesis: how to plan, draft, write and finish a doctoral dissertation, 2003. Macmillan, pp 256.
9. Martha Davis Scientific courses and presentations, 2005. Academic press, Tokyo.pp.356
10. Robert A. Day How to write pub a scien COURSE 5thed, the Oryx Press, 88 West Port, CT06881, pp.275

SYLLABUS
of
Ph.D Course-work in Geology
(For Research Students admitted in 2011-2012 Batch onwards)
Specialization -I
PAPER-II(A): IGNEOUS AND METAMORPHIC PETROLOGY

UNIT-I

Classification of Igneous Rocks: Phase equilibria studies - uni, binary and ternary component magmas, indicate systems with reference to petrogenesis. Law of thermodynamics. Rare earth elements and their significance in petrogenetic studies.

UNIT-II

Bowen's reaction principle, generation and evolution of magmas. Origin of Igneous rocks, primary magmas, differentiation and assimilation-role of volatiles in the formation of Igneous rocks. Evolution of the early crust. Granite - Greenstone belts and their tectonic significance.

UNIT-III

Geochemical (major and trace elements including REE) characteristics of Igneous rocks as petrogenetic indicators. Trace element parameters useful in evaluating petrogenetic models. Characteristic REE patterns of some important Igneous Rocks. Occurrence, characteristic petrological and geochemical features and petrogenesis of the following rock types : Granites – Ophiolites –Alkaline rocks – Carbonotites – Kimberlites – Basalts – Lamprophyres –Dolerites, Nepheline syenites, Syenites, Pegmatites, Anorthosites and Ultramafic Rocks.

UNIT-IV

Types of metamorphism. Process of metamorphism and metasomatism. Concept of metamorphic facies. Metamorphic facies series. Paired metamorphic belts and their significance, Retrograde metamorphism. Study of important metamorphic rock types of India: Khondalites, Amphibolites, leptynites- Charnockites their petrography, geochemistry and Petrogenesis. Tectonism and metamorphism.

REFERENCES:

1. Barker,D.(1983). Igneous rocks, Prentice Hall, New Jersey. 417pp.
2. Best, M.G. (1986). Igneous and Metamorphic Petrology, CBS, Publ., Delhi, 630pp.
3. Condie, K.C. (1982) Archaean Greenstone belts. Elsevier...
4. Leelanandam, C. (1987) Proterozoic anorthosite massifs: An overview. Indian Journal of Geology, v.9, pp.179-194.
5. Leelanandam,C.(1987) Archaean anorthosite complexes: An overview. In Saha, A.K.(ed.) Geological Evolution of Peninsular India – Petrological and structural aspects. Hindustan Publ., Delhi, pp. 108-116.
6. Wilson,M.(1989) Igneous petrogenesis: A Global Tectonic Approach, Unwyn Hyman, London, 466pp.
7. Leelanandam,C.(ed) (1989) Alkaline Rocks. Geo. Soc. India Memoir No. 15, 311 pp.
8. Petrology of Igneous Rocks H.Hatch, A.K. Wells & M.K.Wells, CBS, Publ, Delhi. 554 pp.
9. Mason, B and Moore, C.B.(1991) Principles of Geochemistry, Fourth Edition, Wiley Eastern Ltd, New Delhi, 350 pp.

SYLLABUS
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For Research Students admitted in 2011-2012 batch onwards
Specialization -II
PAPER-II(B): HYDROGEOLOGY

UNIT-I

Classification, mode of occurrence and distribution of groundwater. Hydrologic and physical properties of rocks and soil materials and their relation to the occurrence and movement of groundwater. Aquifers: Classification of aquifers, geological formations as aquifers and mechanics of aquifer system, importance of aquifer characteristics in hydrological investigations.

UNIT-II

Darcy's Law, hydraulic conductivity, specific yield, specific retention, storage co-efficient, types of groundwater flows, methods, analysis and interpretation of pumping tests, tracer tests. Artificial recharge. Different groundwater prospecting methods. Application of remote sensing techniques in Hydrogeology.

UNIT-III

Groundwater pollution, Factors contributing for groundwater pollution, River pollution, off-shore oil pollution, saline water intrusion, agricultural pollution, industrial pollution, urban Pollution, Sewage-septic tanks, cess-pools, roadways. Wells - Construction, design and sinking of wells and their maintenance. Groundwater provinces of India.

UNIT-IV

Groundwater Dynamics, water budgeting, groundwater modeling, groundwater legislation, Groundwater recharge methods, groundwater occurrence resource and management. Groundwater contamination problem and environmental influence. Geo-chemistry of Groundwater.

References:

1. Groundwater Hydrology by David K. Todd, John Willey & Sons, Inc. London.
2. Groundwater Resource evaluation by William C. Walton, McGraw-Hills Book.
3. Hand book of applied Hydrology by Van Te Chow, Mc Graw-Hill Book co.NY.
4. Groundwater and wells, by JohnSons, E.E.1966, Edward E.johnson Inc. St.Paul Minnesota.
5. Hydrology by H.M.Ragunath.
6. Ground water pollution by fired J.J.
7. Deciphering of Ground water from Ariel Potography by Needov & Pora.
8. Groundwater and Tube Wells by S.P. Garg.
9. Groundwater Assessment Development & Management by Karanath, K.R.
10. Applied Hydrogeology-Fetter, C.W.
11. Hydrogeology-Dav s, S.N. & Dewiest, R.J.M.
12. Geohydrology – Dewiest, R.J.M.
13. Groundwater Freez, R.S. Allan & Cherry J.A.

**FACULTY OF SCIENCE
GEOLOGY
Pre Ph.D. EXAMINATION
Model Question Paper
Paper: I/II (Title)**

Time: 3 Hrs

Max.Marks: 100

- Note: i. Answer ALL questions
ii. All questions carry equal marks

1. **Write short notes on :** (ONE question is to be set from each unit)
Each question carries 5 marks. **4 x 5 = 20**
- a) **Question from Unit I**
 - b) **Question from Unit II**
 - c) **Question from Unit III**
 - d) **Question from Unit IV**

(TWO questions are to be set from each unit)
Each question carries 20 marks. **4 x 20 = 80**

2. **From Unit I**

a)

Or

b)

3. **From Unit II**

a)

Or

b)

4. **From Unit III**

a)

Or

b)

- 5 **From Unit IV**

a)

Or

b)

KAKATIYA UNIVERSITY

Department of GEOLOGY

Pre Ph.D Syllabus contents and Scheme of Examination (For the candidates admitted from the academic Year 2011-2012)

Paper	Paper code	Title of the paper	Duration of the Examination (hrs)	Min. Marks	Max. Marks
Paper-I	General	Research Methodology in Geology	3	50	100
Paper-II(A)	Specialization - I	Igneous and Metamorphic Petrology	3	50	100
Paper-II(B)	Specialization - II	Hydrogeology	3	50	100

Note:

Students, enrolled in Ph.D. Course, shall have to deliver two Departmental seminars on his/her PhD topic. Seminar will be of about 45-minutes duration. The presentation will be followed by questions session by the audience. Every student shall be required to submit the synopsis of the topic of his/her seminar duly certified and forwarded by the supervisor to the Head & Chairperson BOS of the Department so that the same can be displayed on the notice board