

BHAGWANT UNIVERSITY
Sikar Road, Ajmer
Rajasthan



Syllabus

Institute of life Sciences & Applied Sciences
M. Phil
(Geology)

ANNUAL SCHEME OF EXAMINATION:

1. Every candidate shall be required to offer three written papers and one dissertation (equivalent to one paper). Within this frame work the Board of Studies shall recommend the course of study for the M. Phil examination.
2. The course of study for the M. Phil degree shall extend over a period of one academic year. There shall be a continuous internal assessment and as external assessment. The proportion of internal and external assessment shall be 30:70. There will be no internal assessment in the dissertation. Total marks for M. Phil will be 400. Dissertation may be written by the candidates under the supervision of any teacher who is registered as M. Phil Supervisor. Supervisor can guide normally five dissertations. However, the maximum limit may be relaxed by the permission of Vice-Chancellor on the recommendation of Head. The internal Supervisor can guide five candidates and workload of six hours is admissible for each M. Phil course for dissertation. The Supervisor will sign and issue a certificate counter signed by the Head of department concerned.
3. The internal assessment may be evaluated on the basis of:
 - (a) Mid Terms : 15 Marks
 - (b) Assignments /Seminar Presentation /Group Discussion: 15 Marks
4. Each theory paper shall consist of 100 marks. The dissertation shall also consist of 100 marks. For a pass, a candidate shall be required to obtain (a) at least 40% marks in each paper separately (b) a minimum of 50% marks in the aggregate of all the papers prescribed for the examination. In the mark sheet, successful candidates shall be classified as under

First Division	65% or more.
Second Division	50-65%
- 6- A candidate will have to pass individually both in the Internal as well as external examination and it should be shown separately in the marks sheet.
- 7- The placement of every candidate under a Supervisor/Guide shall be decided within two months from the last date for admission.
- 8- A candidate who fails at the examination even in one paper/dissertation shall be required to reappear at the examination in a subsequent year in all the papers/dissertation prescribed for the examination, provided that a candidate who obtains at least 50% marks in dissertation shall be exempted from the submitting a fresh dissertation and the marks obtained by him shall be carried forward for working out his result.
- 9- For each theory paper 10 questions will be set for the final examination and the candidate will have to attempt at least five questions. All the questions will carry equal marks.
- 10- Workload distribution: There will be a teaching of four periods of one hour duration per week for each theory paper and six hours for dissertation.
i.e. 4X3 = 12 hours for theory papers and six hours for dissertation per week.

M. Phil. Geology

Subject Code	Subject Name	Teaching hours			Distribution of marks					
					Theory Papers			Practical's		
		L	T	P	Internal	External	Total	internal	External	Total
01MPL12101	Research Methodology and Environmental Geology	3	1	-	30	70	100	-	-	-
01MPL12102	Hydrogeology and Engg. Geology	3	1	-	30	70	100	-	-	-
01MPL12103	Exploration and Mining Geology	3	1	-	30	70	100	-	-	-
01MPL12201	Dissertation	-	-	6	-	100	100			
Total		9	3	6	90	310	400			

Grand Total-400

PAPER I

RESEARCH METHODOLOGY & ENVIRONMENTAL GEOLOGY

. 01MPL12101

Unit I

Environment-

Scope, Physical and Biological environment. Fundamental

concepts of Environmental Geology. Earth materials and earth Processes. Hazardous earth processes: River flooding; Landslides; Earthquakes; volcanoes and coastal hazards. Soil profiles & soil quality degradation due to irrigation, use of pesticides & fertilizers.

Unit II

Environmental Degradation. Pollution-Factors, types; Air pollution; Hydrology and water pollution. Sediments and soil erosion. Waste and their disposal. Geologic factors of environmental health. Environmental degradation and Pollution India. water logging problems. tsunamis & their environmental impact

UNIT III

Earth Resources with special emphasis on minerals, rocks, soil and air. Environmental impact of mineral development, Land use planning, management: concept and basis, Resource management, Site selection and evaluation, for various purposes. Landscape aesthetics. environmental impact and assessment. Desertification and environmental impact. Environmental planning to mining, agriculture, urban, air environment, global climatic change. Global environmental problems and international co-operation. Environmental law.

Unit IV : Research Methods

Problem selection – Literature survey – Familiarity with ideas and concepts of investigation – acquiring technical skills – drawing inferences from data – qualitative and quantitative analysis – accessing the problems – results and conclusions – presenting a scientific seminar – publication of research paper – art of writing of thesis.

Unit V: Errors Analysis & Techniques of Analysis

Gross, systematic and random – central value Statistical treatments of data – rejection of data – method of least squares – variance and standard deviation

Methods and techniques : Survey, case study, Probability and Sampling.

Mean, Standard Deviation, Coefficient of Variation.

Correlation, chi-square test. Analysis, Q test, Interpretation and Report writing

Suggested reading

1. Keller, E.A.- Environmental Geology (CBS)
2. Valdiya K.S. - Environmental Geology. Tata MGH
3. Coates, D.R. - Environmental Geology
4. Flannery, P.T. Environmental Geology Conservation land use planning and Resource Development.

5. Cooke and Drunkamp- Geomorphology in environment Pollution.
6. Horn, B.& Scott, M.- Geological Hazards (Springer Verlag)
7. Tank, R.W.- Focus on Environmental Geology (Oxford)
8. Savindra Singh - Environmental Geography. Prayag Pustak Bhawan.

PAPER II

HYDROGEOLOGY AND ENGINEERING GEOLOGY

. 01MPL12102

UNIT –I

Hydrogeology-

Introduction: scope, historical background and utilization of ground water, hydrological cycle and sources of ground water: Rock properties affecting ground water : Porosity and permeability: Vertical distribution of ground water: Aquifers and their types: G.W. Basins, G.W. movement Darcy's law coefficient of permeability: Measurement of permeability: tracing G.W. movement and dating flow lines. water wells: their types and construction methods of common types of rock,

UNIT –II

Ground water quality; Measures of water quality: physical, chemical & bacteriological analysis: water quality criteria for drinking, irrigation & industrial purposes G.W. pollution and restoration: collection of water samples, analysis of ground G.W. monitoring,

UNIT –III

Basin wide G.W. development: safe yield & overdraft: Equations of hydrologic equilibrium; data collection for basin investigation: method of computing safe yield: variability of safe yield: conjunctive use of surface & G.W. reservoirs. G.W. exploration: Geologic and hydrogeologic methods: Geophysical exploration: test drilling; test drilling;

UNIT –IV

Application of Geology in Civil engineering. Engineering properties of rocks for road and building construction Importance and stages of geological exploration; including sub surface exploration for important engineering projects.

UNIT –V

Hydrogeological and geophysical well logging. Artificial recharge; need and benefits, methods of artificial recharge: induced recharge, recharge;

subsurface dams; recharge wells for storm drainage. G.W. Development & Potentials in India G.W. Potentials of Rajasthan.

Geotechnical studies for Dams, Tunnels, Bridges, pavements Buildings. Landslides. Earthquakes and aseismic design.

Suggested readings

1. Todd. D.K.- Ground Water Hydrology (J. Wiley & Sons)
2. Daranth, K.R. - Ground water Assessment
3. Garg, S.P.- Ground water & Wells.
4. Krynine & Judd- Principles of Engineering Geology and Geotectonics (McGraw Hill)
5. Parbin Singh - Engineering and General Geology
6. Sathya Narayan swami, B.S. - Engineering Geology (Dhanpat Rai & Co.)
7. Blyth - Geology of Engineers (ELBS)

PAPER III

EXPLORATION AND MINING GEOLOGY

01MPL12103

.Unit I

Exploration and its types. Surface exploration: topographic surveying - chain, compass and tape, plane table, theodolite: leveling and contouring.

Unit II

Geologic mapping - reconnaissance and detailed surface mapping - Base map and topo sheet, mapping techniques for lithologies, field data collection. Subsurface mapping, sampling and tonnage: sampling and types: average assays.

Unit III

Guides to ores: targets, loci, regional guides, geochemical guides: physiographic guides: mineralogical guides: stratigraphic and lithologic guides: structural guides fractures, folds, faults: Persistence of ore in depth.

Unit IV

Geochemical prospecting geochemical processes - primary and secondary : pathfinder: anomalies; geochemical field techniques and analysis: geobotanical surveys: geochemical methods for petroleum exploration. Subsurface exploration: drilling and types, bore hole problems, bore hole samplings, Preservation and sampling of cores; Geophysical prospecting

electrical, gravity, magnetic, seismic, radio active method, well logging, aerial geophysical survey

Unit V Mining methods of brecking rocks, explosives. Mining terminology. classification of mining methods. Aluvial mining; open cast mining; under mining coal mining.

Suggested reading

1. Arogyaswami, R.N.P.- Courses in Mining Geology (Oxford & I.B.H.)
2. Mckinstry, H.E. - Mining Geology (Asia Publishing House)
3. Haekes R. & Webb- Geochemistry in Mineral Exploration (Academic Press)
4. Levinson- Introduction to exploration Geochemistry (Applied Publishers)
5. Robinson and Courch-Basic exploration Geophysics

PAPER IV

**Dissertation (any theoretical/experimental/
01MPL12201**

Investigatory Topics of M.Phil Standard
Out of theory papers.