BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024

M.Phil. GEOLOGY [FT / PT] Programme

(For the candidates to be admitted from the academic year 2009-2010 onwards**)**

Semester I	**Title of the Course**	**Marks**			**Credits**
		IA	**UE**	**Total**	
Course -I	Research Methodology	40	60	100	4
Course - II	Recent Research in Geology	40	60	100	4
Course- III	Paper on Topic of Research (Guide will prepare the syllabus and it will be sent to the COE)	40	60	100	4
Course – IV	Teaching and Learning skills (Common Paper)	40	60	100	4
Semester II					
	Dissertation and Viva-Voce Viva Voce 50 marks Dissertation 150 marks			200	8

For each Course other than the Dissertation

Continuous Internal Assessment (CIA) – 40 Marks

End Semester Examination (ESE) – 60 Marks

Total – 100 Marks

Question paper pattern for Course IV

5 Questions 05 x 12 = 60 Marks (either or type, one from each unit)

CIA components

Tests (2x10) - 20 Marks

Term Paper – 10 Marks

Seminar - 10 Marks

COURSE – I - RESARCH METHODLOGY

UNIT I

Library research and preparation of research report-Use of Libraries and information retrieval systems-Use of abstracts-Abstraction-Preparation of index cards-Methods of editing-preparation of Manuscript-title-introduction-Review of Literature-objectives and purposes of Experimental Methods-Results, tables and figures-Discussion-References-Style of Writing-Field methods of geological investigations-Preparation of Field Reports.

UNIT II

Microscope and U-stage Techniques-Determination of Anorthite content in Plagioclase and Twin laws-Optic Orientation-Extinction angle-Pleochroic scheme-Birefringence-Principles and basics of X-ray diffraction in methods of mineral investigation.

UNIT III

Modern techniques of chemical investigation of minerals and rocks using spectrophotometer, Flame photometer, and Atomic Absorption Spectrometer. Inductively Coupled Plasma-Coal petrography-Ore microscopy and Ore petrography-Nuclear Geology-Nuclear devices and techniques-Isotope age dating Stable Isotope-Cosmic ray induced radioactivity.

UNIT IV

Sedimentological techniques-Size and shape determination of grains in Clastic rocks and their graphic representations-Heavy mineral analysis-Palaeontological and Micropaleontological techniques pertaining to microfossils (Foraminifera,Ostrocoda,Spores and Pollen)-Field sampling and collection Separation of microfossils.

UNIT V

Applications of Remote Sensing to oil and Mineral Exploration-Groundwater management-Site selection for Engineering projects-Geoenvironmental studies-Landslides-Introduction to GIS and its applications-Map Components-Preparation of topographic,Geologic,Geomorphic,Landuse and Soil maps-bathymetric maps-Geological techniques pertaining to offshore mineral exploration for manganese nodules,phosphorites,and Petroleum.

Petroleum exploration-Geophysical methods in Petroleum exploration-well logging methods –data interpretation-Geochemical and Geobotanical techniques for mineral exploration.

REFRENCE BOOKS

1. Freedman.P-The Principles of ScientificResearch, Mc Donald and Co., London, (1949).
2. Rajammal. P., Devadas and Kulandaivel-A Handbook of Methodology and Research, -Sri R.K.M. Vidyalaya Press, Coimbatore,(1976).
3. Jonathan Anderson et.al – Thesis and Assignment Writing – Wiley Eastern Ltd., New Delhi,(1970).
4. Parsons, C.J. –Thesis and Project work – Allen and Unwin Ltd., London, (1973).
5. Maeve O' Connon. R and Peter Woodford – Writing Scoentific Papers in English, (1976).
6. W.I.B. Beveridge –The Art of Scientific Investigation- 3rd Edition, Bpdley Head Pub. Co, London,(1952).
7. Winchell and Winchell – Optical Mineralogy Vol-I and II-Wiley Eastern Pvt.Ltd., New Delhi, (1968).
8. P.R.J.Naidu – Johanssen's Optical Mineralogy – Allied Publishers Pvt.Ltd., New Delhi, (1967).
9. Groves A.W.-Silicate Analysis – Allen and Unwin Ltd., Uk, (1951).
10. Easton – Chemical Analysis of silicate Rocks-Elsevier Publications.
11. Sears,S.W.- Optics-Asia Publishing House, New Delhi,(1958).
12. Azaroff.L & Buerger, M.J-Power Method in X-ray Crystallography.
13. Shapiro, L & Brannock, W.M – Geological Survey Bulletin of America, No.165, (1063c), (1956).
14. Lueder, R.D – Aerial Photography Interpretation – McGraw Hill Book & Co., New York.
15. Miller V.C. & Miller. C.F-Photogeology-McGraw Hill Book & Co., New York.
16. Todd.D.K-Groundwater Hydrology-2nd Edition, Wiley Inter-science, New York, (1982).
17. Jones D.J-Introduction to Microfossils –Harper & Brothers, USA,(1958).
18. Brasier, M.D- Introduction to Micropaleontology – Chapman and Hall, UK, (1985).
19. Bignot – Elements of Micropaleontology – Chapman and Hall, UK, (1985).
20. Kummel. B., and Raup. D – Handbook of palaeontological Techniques, W.H. Freeman and Co., (1965).
21. Aswathanarayana. U, Principles of Nuclear Geology – Oxford & IBH Ovt.Ltd., New Delhi, (1985).
22. Faure. G-Principles of Isotope Geology – John Wiley and Sons, New York, (1987).
23. Pandey S.N – Principles and Applications of Photogeology-Wiley Eastern, New Delhi, (1994).
24. Curran P.J – Principles of Remote Sensing-Longman, London, (1985).
25. Sabins. F.Jr – Remote Sensing – Principles and Interpretation, Freeman, Sanfranciso.

QUESTION PAPER PATTERN

1. Total Duration of time each paper is three hours
2. Total number of questions to be asked with internal choice for each question is FIVE.
3. All the five questions are to be answered.
4. All questions carry equal marks i.e., 5X12 = 60marks.
5. Each answer should not exceed 2000 words.
6. Each question (including either/or choice) should be selected from each unit.

****

COURSE – II - RECENT RESEARCH IN GEOLOGY

Unit-I Geochemistry

Geochemistry and its application to geological problems in Archean rocks- Distribution of Trace elements in different rock types and their significance in Petrological studies of Igneous, Sedimentary and Metamorphic rocks-Gneiss-Granulite terrain-Distribution in space and time –Geochronology and Isotope data-Different rock Formations and their geochemical aspects- Origin and evolution of Gneiss- Granulite terrain – Mineralization in the Archean High grade regions.

Unit-II - Hydrogeology

Quality of Ground Water – physical, Chemical and Biological constituents of Groundwater-Water quality criteria for drinking, industrial and irrigation purposes- Flow net analysis-Saturated and unsaturated flow net- seepage flow and Dupuit flow-Hydrologic budgets-Hillslope hydrology and stream flow generation-Groundwater in Crystalline and Sedimentary systems- Piezometric tests- Pumping tests- Basin yield-Sea water intrusion- Sources of groundwater contamination- Groundwater and Economic mineralization.

Unit-III (Environmental Geology)

Fundamental concepts of Environmental Geology- Renewable energy sources-Geothermal resources- solar energy- Atomic energy+y-Tidal energy-Water power-Wind power- Energy from Biomass-Energy and water demand-Energy for tomorrow-

Unit IV

Air pollution and global climatic change-Mineral resources of the Ocean- Waste Disposal methods. Concentration of Trace elements in the Environment- Effects of Trace elements- Chromium- Cobalt-Flourine-Molybdenum- Influence of Geology and Geography on Disease- Water composition and cardiovascular health- Soil and Cancer- Endemic goiter- Osteoporosis- Dental cavities-Cardiovascular mortality.

Unit - V - Geostatistics

Introduction-Plotting a semi – Variogram on a graph- Experimental semi- Variogram with reference to Vein deposits – measured rainfall at rain gauge sites – Volume variance calculations – Kriging – Sampling errors

Reference Books:

1. Brain Mason and C.B. Moore- Principles of Geochemistry-4th Edition, Wiley Eastern, New Delhi,(1982)
2. C.S.Pichamuthu-Archean Geology- Oxford and IBH Pub Co, New Delhi, (1974)
3. D.K.Todd-Groundwater Hydrology-Willey Interscience,New York, (1982)
4. R.A.Freeze and J.A. Cherry- Ground water-Prientice Hall,inc.N.J
5. E.A.Keller- Environtal Geology-CBS Publishers and Distributors, New Delhi, (1988)
6. D.N.Cargo and B.F.Mallony Addison – Man and his environment – Addison Wesley Pub.Co., London.
7. G.Davis-Statistical and Data Analysis in Geology-2nd Edition, Wiley Interscience, New York,(1980).
8. Isobel Clark-Practical Geostatistics-Elsevier Pub.Co., London and New York(1980).
9. Krumbein and Graybill-Statistical Methods in Geology-McGraw Hill & Co.,(1964).

QUESTION PAPER PATTERN

1. Total duration of time each paper is three hours.
2. Total number of questions to be asked with internal choice for each question is FIVE.
3. All the five questions are to be answered.
4. All questions carry equal marks i.e., 5X12 = 60marks.
5. Each answer should not exceed 2000 words.
6. Each question (including either/or choice) should be selected from each unit.

****

COURSE –IV – TEACHING AND LEARNING SKILLS

Objectives:

- acquaint different parts of computer system and their functions
- understand the operations and use of computers and common Accessories
- develop skills of ICT and apply them in teaching learning context and Research
- appreciate the role of ICT in teaching, learning and Research
- acquire the knowledge of communication skill with special reference to its elements, types, development and styles
- understand the terms communication Technology and Computer mediated teaching and develop multimedia / e-content in their respective subject
- understand the communication process through the web
- acquire the knowledge of Instructional Technology and its Applications
- develop different teaching skills for putting the content across to targeted audience

Unit I – Computer Application Skills

Computer system: Characteristics, Parts and their functions – Different generations of Computer – Operation of Computer: switching on / off / restart, Mouse control, Use of key board and some functions of key – Information and Communication Technology (ICT): Definition, Meaning, Features, Trends – Integration of ICT in teaching and learning – ICT applications: Using word processors, spread sheets, Power point slides in the classroom – ICT for Research: On-line journals, e-books, Courseware, Tutorials, Technical reports, Theses and Dissertations

Unit II – Communication Skills

Communication: Definitions – Elements of Communication: Sender, Message, Channel, Receiver, Feedback and Noise – Types of Communication: Spoken and written; Non-verbal communication – Intrapersonal, Interpersonal, Group and Mass communication – Barriers to communication: Mechanical, Physical, Linguistic & Cultural – Skills of communication: Listening, Speaking, Reading and writing – Methods of developing fluency in oral and written communication – style, Diction and Vocabulary – Classroom communication and dynamics

Unit III – Communication Technology

Communication Technology: Bases, Trends and Developments – Skills of using Communication Technology – Computer Mediated Teaching: Multimedia, E-content – Satellite-based communication: EDUSAT and ETV channels, Communication through web: Audio and Video applications on the Internet, interpersonal communication through the web.

Unit IV – Pedagogy

Instructional Technology: Definition, Objectives and Types – Difference between Teaching and Instruction – Lecture Technique: Steps, Planning of a Lecture, Delivery of a lecture – Narration in tune with the nature of different disciplines – Lecture with power point presentation – Versatility of lecture technique – Demonstration, Characteristics, Principles, Planning Implementation and Evaluation – Teaching – Learning Techniques: Team Teaching, Group discussion, Seminar, Workshop, Symposium and Panel Discussion – Models of teaching: CAI, CMI and WBI

Unit V – Teaching Skills

Teaching skill: Definition, Meaning and Nature – Types of Teaching skills: Skill of Set Induction, Skill of Stimulus Variation, Skill of Explaining, Skill of Probing Questions, Skill of Black Board writing and Skill of Closure – Integration of Teaching Skills – Evaluation of Teaching Skills

References:

1. Bela Rani Sharma (2007), Curriculum Reforms and Teaching Methods, Sarup and sons, New Delhi
2. Don Skinner (2005), Teacher Training, Edinburgh University Press Ltd., Edinburgh
3. Information and Communication Technology in Education: A Curriculum for Schools and programme of Teacher development, Jonathan Anderson and Tom Van Weart, UNESCO, 2002
4. Kumar K.I (2008) Educational Technology, New Age International Publishers, New Delhi
5. Mangal, S.K. (2002) Essential of Teaching – Learning and Information Technology, Tandon Publications, Ludhiana
6. Michael D. and William (2000), Integrating Technology into Teaching and Learning: Concepts and Applications, Prentice Hall, New York
7. Pandey S.K. (2005) Teaching Communication, Commonwealth Publishers, New Delhi
8. Ram Babu A. and Dandapani S (2006) Microteaching (Vol.1&2) Neelakamal Publications, Hyderabad
9. Singh V.K. and Sudarshan K.N. (1996) Computer Education, Discovery Publishing Company, New York
10. Sharma R. A. (2006) Fundamentals of Educational Technology, Surya Publications, Meerut
11. Vanaja. M. and Rajasekar S. (2006) Computer Education, Neelkamal Publications, Hyderabad.

****