Vikram University, Ujjain (M.P.)

"NAAC "A" Grade"

According to Ph.D. Ordinance No. 11

Course Work

Ph.D. (Geology)

Session: 2018 – 2019

Vikram University, Ujjain (M.P.)

According to Ph.D. Ordinance No. 11

Course Work
Ph.D. (Geology)
Session: 2018 – 2019

Scheme of Papers/Examination

Paper	Title of Paper	Maximum Marks			Credits
		End- Semester Examination	CCE	Total	
I	Research Methodology	60	40	100	4
II	Computer Application	60	40	100	3
III	Advance Course in Geology	60	40	100	3
•	Review of Published Research in the relevant field	60	40 (oral)	100	3
•	Comprehensive Viva-voce	-	-	100	3
	TOTAL			**500**	**16**

Note – If student obtain F or AB Grade in a course/subject, he/she will be treated to have failed in that course. He/she have to reappear in the examination of the course as and when conducted or arranged by the UTD I the next semester. Marks obtained earlier in continuous assessment may be carried forward and added to the marks obtained in repeat end-semester examination to decode the grade in the repeat course. The student has to pay the prescribe fee for repeating the course. If he/she future fails in the course, he/she shall not be given another chance and he/she shall be out of the Ph.D. program. No student shall be allowed to repeat the course to improve the grade if he/she passes the course.

- The candidate has to obtain a minimum of 55% of marks or its equivalent grade points in aggregate in the course work in order to be eligible to continue in the Ph.D. program.

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COURSE WORK

Ph.D. (Geology)

PAPER I: RESEARCH METHODOLOGY IN GEOLOGY

Unit – I

Concept of research, Invention and innovation, Identification of research problem, References and their types, Plagiarism, Review of Literatures, preparation of Abstracts and Synopsis.

Unit – II

Concept of Scale, Topography and Topographic Maps, Contours, Bearing, Dip and Strike, Sampling methods – Random, Systematic, Grid, stratified, Cluster, Methods of Primary and Secondary data collection. Basic Concept of Physical and Chemical analysis of Geological Samples.

Unit – III

Microscopic Investigation Techniques, Methods of analysis of water samples, Methods of analysis of powder samples, Interpretation and representation of data in Geological studies.

Unit – IV

Concept of Remote Sensing and GIS, Types of Satellites and their data products, Images – pixel, Resolution, Contrast, Digital Number, Band Correlation, Slicing, Concept of layered data and its application in geological studies. Three dimensional data and Maps.

Books: Standard books

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COURSE WORK
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Paper II: COMPUTER APPLICATION IN EARTH SCIENCE

Unit – I

Fundamental of Computer: Hardware, Software; Input – Output Devices, Binary Number, Basic Concept of Networking, Internet.

Unit – II

MS – Word: Text and table, editing, export – imports, formatting of Texts and objects in MS – power Point.

MS – Excel: Tables and formats, Basic maths and statistical functions, Charts and Graphs, Linked tables.

Unit – III

Statistical Measures: Basic concept of Mean, Median, Mode, Standard derivation, Kurtosis, Skewness. Statistical correlation and regression and their interpretations.

Unit – IV

Image Analysis: Basic Concept of raster and vector data, Pixel and Image histogram, basic concept of image pattern study. Concept and layered data and GIS.

Books: Standard books

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COURSE WORK
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Paper III: ADVANCE COURSES IN GEOLOGY

SEDIMENTOLOGY: Process of sedimentation, Classification and Nomenclature of the Common Sediments. Stoke's Law of Sediments. Sedimentary Structures. Paleocurrent Significance in Quality Assessment. Textures of Sedimentary Rocks and Their Genetic Significance.Granulometric Analysis of Clastic Particles. Sedimentary Environments. Evaporites and Volcano- Clastic Sediments. Concept and Types of Sedimentary Provenance. Heavy minerals: Their separation and Utility in the Provenance Analysis. Classification of Sandstone.

COAL: Origin of Coal, Elementary idea about Coal Mining Methods. Coal Bed Methane. Methods of Coal Prospecting. Preparation of Coal for Industrial Purpose (Washing). Carbonization (Coke Manufacturing), Gasification and Hydrogenation. Briquetting of Coal. Analysis Rank and Varieties of coal. Macroscopic Ingredients and Microscopic Constituents (Lithotypes, Maceral, and Microlithotypes).

PETROLEUM: Origin and Geology of the Productive Oil Fields of India. Migration and Accumulation (oil-traps) of Petroleum and Natural Gas. Source rock and hydrocarbon generation. Major typesof hydrocarbon of Interest to petroleum Exploration. Basic geological condition that create petroleum Traps, Reservoir Fluid Mechanics.

STRUCTURAL GEOLOGY: Rock failure: Mechanical principles of rock deformation, factors controlling behavior of material. Concept of stress and strain in two and three dimension, progressive deformation. Mohr circles. Symmetry concept in deformation. Unconformities. Progressive deformation – simple and pure shear. Geometry of folds surface. Super – imposed folding. Classification and Types of folds. Geometry of faults. Classification and types of faults. Slips, separation, Causes of faulting. Mechanics of faulting. Origin , kind and their relation to other structures: fractures and joints, lineation, Foliation. Rock cleavages and schistosity. Mechanics of folding and faulting. Tectonic Fabrics. Magma Tectonics: emplacement of plutons, origin of Ring Dykes and Cone Sheets.

HYDROGEOLOGY: Distribution of water. Hydrological cycle, Evaporation, Condensation, Precipitation and its types. Ground water: Origin, importance, occurrences. Groundwater provinces of India. Geological factors governing the occurrence of ground water. Porosity, permeability, specific yield, specific retention, hydraulic conductivity, storage coefficient, aquifers and their classification. Groundwater flows, Darcy's Law. Water level fluctuation.

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Elementary idea about pumping test. Ground water quality: Physical and Chemical characteristics. Biological characteristics. Water contaminants and pollutants. Radioisotopes in Hydrogeological Studies. Geophysical methods of groundwater exploration. Salt water intrusion in coastal aquifers,. Water harvesting & artificial recharge methods. elementary idea about groundwater development & conservation.

REMOTE SENSING: Introduction to aerial photography. Types of aerial photos. Geometric principles of photographs – relief and tilt displacement. Vertical Exaggeration and distortions. Measurements from Aerial Photographs. Scale. Distance. Area and Height. Preparation of Photo-geologic Maps. Mosaic controlling factors of aerial photograph. Flight plan, area, purpose time and season of photography. Introduction to overlap, sidelap, drift, crab, fiducial marks. Elements of Interpretation of aerial photographs. Electro-Magnetic spectrum. Space platforms. Reflectance of minerals. Vegetation, rocks and water. Elementary idea about active and passive sensors. Introduction to IRS mission. Multispectral scanners (MSS). Thematic Mappers (TM). Linear imaging self scanning (LISS). Elementary idea about image processing concept of Geographic Information System (GIS). Applications of photo Geology and Remote sensing in the study of Geomorphology, Lithology and Structural Features and Hydrogeologic studies.

Books: As referred in the teaching of above course

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COURSE WORK

Ph.D. (Geology)

- **Review of Published Research in the relevant field** Max. Marks: 100
- **Comprehensive Viva-Voce** Max. Marks: 100

VIKRAM UNIVERSITY, UJJAIN (M.P.)

According to UGC Regulation – 2009 and Ordinance 90 (Revised)

COURSE WORK

Ph.D. (Geology)

- **Comprehensive Viva based on subject** — **Max. Marks: 50**

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