Chhindwara University, Chhindwara (M.P.)

SYLLABUS OF M.Sc. GEOLOGY SEMESTER SYSTEM

SEMESTER-I (Session-2019-20)

Syllabus opted by the Board of Studies in **Geology** Chhindwara University in the meeting held on 02/11/2019

Session	Course	Title of papers	Max. Marks Th. + CCE	Max. Marks Practical Exam + Sessional	Minimum Passing Marks Theory/CCE and Practical	Total Marks
First	Paper-I	Geodynamics	40 + 10	-	15/4	50
	Paper-II	Structural Geology	40 +10	-	15/4	50
	Paper-III	Geomorphology	40 +10	-	15/4	50
	Paper-IV	Mineralogy and Geochemistry	40 +10	-	15/4	50
	Practical-1	Structural Geology and Geomorphology	-	40 + 10	17	50
	Practical-2	Mineralogy and Crystallography	-	40 + 10	17	50
					Total Marks	300

Board of Studies:

1. Chairman- Prof A.K. Shandilya — 2.11.2019

II- Subject Expert –

1. Dr. V. Gadgil 2/11/19

2. Dr. R.S. Raghuwanshi 2.11.19

2. Dr. Amar Shrivastava 2.11.19

4. Prof. M.L. Pakhale 02-11-19

M.Sc. Geology

Year 2019-2020

SEMESTER-I

Paper I

Geodynamics

MM-40

Unit-1 Earth's surface features. Seismology: seismic waves and their propogation in different media, intensity and isoseismic lines, earthquake belts, Earthquake zones of India, Seismograph, causes of Earthquake. Internal structure of the Earth.

Unit-2 Volcanism: Types and causes of volcanic eruptions. World distribution of volcanoes, Migration of volcanoes. Volcanic landforms. Palaeomagnetism. Andesite Line

Unit-3 Isostasy: Development of the concept, Isostatic anomalies, Isostatic models, Evidence. Geosynclines: Classification and evolution of Geosynclines, causes of subsidence and upliftment.

Unit-4 Continental drift: Development of the concept, Taylor's and Wegner's theories of continental drift. Evidences of continental drift and polar wandering. Sea floor spreading. Morphological features of ocean floor. Island Arc, Ring of fire

Unit-5 Concept of plate tectonics. Types of plate boundaries, features of convergent and divergent boundaries. Ophiolite suites, Arc-Trench system, volcanic mountain chain. Triple junctions and their stability. Causes of plate motion. Origin of the Himalaya.

2.11.19 by A.K. Shawdilya Chairman

2-11-19 Dr Amar Shrivastava

2/11/19 Dr V. Gadgil

2.11.19 Dr R.S. Raghuwanshi

Suggested Readings:

1. Condie K C: **Plate Tectonics and Crustal Evolution**.
2. Davies, Geoffrey F. 1999: **Dynamic Earth**. 1e Cambridge Univ Press Gerald
3. Gutenburg Beno: **Internal Constitution of the Earth**. Dover
4. Hodgson, J H: **Earthquake and Earth's Structures**. Prentice Hall
5. Holmes, Doris L and Arthur: **Holmes' Principles of Physical Geology**. Wiley
6. Martin H P Bott, 1982: **The Interior of the Earth**. Edward Arnold
7. Schubert Donald L. Turcotte, 2002: **Geodynamics.** 2e, Cambridge Univ Press
8. Strahler, A N, 1971: **Earth Sciences**. Harper and Row
9. Wyllie, Peter J: **The Dynamic Earth**. Wiley
10. Wyllie, Peter J: **The Way the Earth Works**. Wiley

The scheme of examination and the allotment of marks shall be as under

Sections/Part	Questions Type	Marks Distribution	Remark
Section -A	Objective Type Questions(At least one question to be set from each unit)	1x5=05 Marks	
Section –B	Short Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted)	2x5=10 Marks	
Section –C	Long Answer Type Question(Two questions to be set from each unit and one from each unit to be attempted)	5x5=25 Marks	
	Total	40 Marks	

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SEMESTER-I

Paper II

Structural Geology

MM-40

Unit-1 Rock failure: Mechanical principles of rock deformation, factors controlling behavior of material. Concept of stress and strain analyses in two and three dimensions. Mohr circles. Progressive deformation.

Unit-2 Geometry of fold surfaces: Single and multi-layered. Super-imposed folding. Geometric and Genetic Classification of folds. Types of folds. Recognition of folds. Effects of folds on outcrops. Mechanics of folding.

Unit-3 Geometry of faults. Classification and types of faults. Slips, Separation, Recognition of faults. Causes of faulting. Mechanics of faulting.

Unit-4 Origin, kinds and their relation to other structures. Fractures and joints, Lineation, Foliations, rock cleavages.

Unit-5 Types and recognition of unconformities. Tectonic fabrics and symmetry concept in deformation. Magma tectonics- emplacement of plutons, origin of ring dykes and cone sheets. Structures in various Rocks. Tectonic framework of India with reference to Peninsula, Himalaya, and Indo-Gangetic Plains.

Suggested Readings:

1. Badgley P C, 1959: **Structural Geology for the Exploration Geology**. Harper and Bro
2. Bayly B 1992: **Mechanics in Structural Geology**. Springer-Verlag
3. Billings, M P : Structural Geology. 3e.

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4. Davis G H 1984: **Structural Geology of Rocks and Region**. John Wiley
5. Fairhurst, C, 1963: **Rock Mechanics: Proceeding**. Pergamen Press
6. Fossen, H, 2016: **Structural Geology**. Cambridge
7. Ghosh S K 1995: **Structural Geology Fundamentals of Modern Developments**.
8. Hobbs, Means and Williams, 1973: **An Outline of Structural Geology**.Wiley
9. Hubert MK 1972: **Structural Geology**. Hafner Publ Co. New York
10. Moore E and Twiss RJ 1995: **Tectonics. Freeman** Pergamon Press
11. Park, R G, 1988: **Foundations of Structural Geology.** 2e Blackie Academy
12. Price NJ and Cosgrove JW 1990: **Analysis of Geological Structure**. Cambridge Univ. P
13. Whitten E H T, 1966: **Structural Geology of Folded Rocks**. Chicago IL

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M.Sc. Geology Session 2019-2020

SEMESTER-I

Paper III

Geomorphology

MM-40

Unit-1 Concept of Geomorphology principles and their significance. Cycle of erosion, Davis' and Planck's cycle of erosion. Slope forming processes: Landslides, soil creep and solifluction.

Unit-2 Fluvial agency: Types of rivers, valley development – base level and its varieties, graded streams, cross profiles of valleys. Classifications of valleys. Drainage patterns and their significance. Erosional and depositional landforms of streams.

Unit-3 Glaciers: Types of glaciers, regimen of glaciers, nourishment of glaciers, wastage of glaciers. Major features resulting from glacial erosion and deposition. Glacio-fluvial features.

Aeolian agency, Topographic effects of wind erosion. Landforms of aeolian deposition. Piedmonts and piedmont problems. Arid cycle of erosion.

Unit-4 Karst topography: Important areas of karst. Conditions essential for development of karst, feature characteristics of karst region. Origin of limestone caverns. Karst geomorphic cycle. Marine erosion. Topographic feature resulting from marine erosion and marine depositions. Classification of coasts. Characteristics of emergence and submergence of coastline. Coastal landforms.

Unit-5 Morphometric Analysis of Terrain and its significance. Morphometric analysis of drainage basin and its significance. Statistical correlation methods for interpretation. The organization of drainage system.

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Suggested Readings:

1. David Lang: **The Earth System**. Brown Publishers
2. Halis, J R: **Applied Geomorphology**.
3. Holmes, Doris L and Arthur Holmes, 1978: **Principles of Physical Geology**. Wiley
4. Mathew Fontaine Maury: **The Physical Geography of the Sea**. Harvard Uni P
5. Oscar Diedrich von Engeln , 1953: **Geomorphology, Systematic and Regional**. McMillan
6. Savinder Singh, 1998: **Geomorphology**. Prayag Pustak Bhawan
7. Small, R J, 1970: **Study of Landforms**. Cambridge
8. Thornbury, W D 1968: **Principles of Geomorphology**. Wiley

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SEMESTER-I

Paper IV

Mineralogy and Geochemistry

MM-40

Unit-1 Atomic Structure, Mneralogical properties and mode of occurrence of the following

i. Sulfides, Oxide, ii. Sulfides (anhydrous and hydrous)

iii) Carbonate(Calcite, aragonite, and dolomite groups), Classification of silicate structure Isomorphsm, Polymorphism, Exsolutions

Unit-2 Atomic structures, Chemistry, Physical and optical properties of following Rock forming mineral groups. Olivine pyroxene, Amphibole, Feldspar, Feldspathoid, Mica, Zeolite, Garnet.

Unit-3 Atomic structures, Chemistry, Physical and optical properties of following Rock forming mineral groups. Quartz and its varieties, Chlorite, Aluminosilicates, Precious and Semi- Precious stones

Unit-4 Principles of optics, Double refraction, Optical classification of minerals, Birefringence, Determination of Refractive Index, Uniaxial and Biaxial Indicatrix, Determination of pleochroic scheme, interference colours, interference figures, and Optic Sign of minerals.

Unit-5 Geochemical classification of elements, Radioactive decay scheme of U-Pb, Rb-Sr, K-Ar & Sm-Nb, Laws of Thermodynamics, Concept of geochemical cycle, Principles of ionic substitutions in mineral (Perthite and Anti perthite), Composition of the Earth.

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Suggested Readings : -

1. Dana, E.S. and Ford, W.E. 2002: **A textbook of Mineralogy** (Reprint).
2. Deer, WA; Howie, RA and Zussman, J 1996: **Rock forming minerals**. Longman
3. Gribble, CD.1993: **Rutley's Elements of Mineralogy**.
4. Kerr, P.F. 1977: **Optical Mineralogy**, McGraw Hill.
5. Klein, C and Huarlbut, CS. 1993: **Manual of mineralogy**. John Willey.
6. Krauskopf, K.B. 1967: **Introduction to Geochemistry**, McGraw Hill.
7. Mason, B. and Moore, C.B. 1991: **Introduction to Geochemistry**, Wiley Eastern.
8. Moorhouse, W.W. (1951): **Optical Mineralogy**, Harper and Row
9. Perkins, D. 1998: **Mineralogy**, Prentice Hall.
10. Phillips, WR and Griffin DT; 1986: **Optical mineralogy**. CBS
11. Winchell, E.N. (1951): **Elements of Optical Mineralogy**, Wiley Eastern.

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