

Mizoram University

UG/Bachelor's Degree Programme with Multiple Entry and Exit

Options Under the New Education Policy 2020

in GEOLOGY

Semester		Course Name	Components with Credits		Total credits
			Theory	Practical	
I	GEOL/MJ/100	Crystallography, mineralogy, and optical mineralogy	3	1	4
	GEOL/MJ/101	General Geology	4	-	4
	GEOL/MN/102	<i>[To be chosen from an MJ course offered by other disciplines]</i>	4	-	4
		Introductory Course (Interdisciplinary)	3	-	3
	AEC/103	MIL/English I	3	-	3
	VAC/104	Understanding India	2	-	2

CRYSTALLOGRAPHY, MINERALOGY, AND OPTICAL MINERALOGY

GEOL/MJ/100

Credits: 3 (Theory) + 1 (Practical)

Objective of the Paper

The course introduces basic fundamentals of crystallography and mineralogy to enable students understand and acquire basic knowledge in this respect. Students will understand and learn the nature and characteristics of various rock-forming minerals and native minerals.

Unit 1: Crystallography

Crystal, elementary idea of crystal structure; Parts of crystal - face, edge, apex, solid angle and interfacial angle; Crystallographic axes and angles; Parameters and indices; Contact Goniometry, Angular measurement, Common crystal forms - cube, prism, pyramid and pinacoid; Elements of crystal symmetry; Introduction to different crystal systems. Study of Normal (Holosymmetric) Class of each crystal system.

Unit 2 Mineralogy

Chemical bonding and compound formation. Minerals, definition and classification (Silicates and Sulphides, Sulphates, Oxides, Carbonates, Nitrates & Native Elements); Processes of mineral formation (magmatic, post-magmatic, pegmatitic, weathering, sedimentary and metamorphic); Common physical properties of minerals (form and shape, color, streak, luster, cleavage, fracture, hardness, tenacity, transparency, specific gravity, magnetic nature).

Unit 3: Optical Mineralogy

Properties of Light, Polarizing microscope, its parts and functioning; Nicol Prism and its construction; Optically isotropic and anisotropic substances; Ordinary and polarized lights; Uniaxial and Biaxial minerals.

Unit 4: Optical Mineralogy

Common optical properties observed under plane-polarized and cross-polarized light; Optical properties of the following common rock-forming minerals: Quartz, Plagioclase, Orthoclase, Microcline, Biotite, Muscovite, Hornblende, Hypersthene, Augite, Garnet, Olivine, Calcite & Tourmaline.

PRACTICAL

1. Chemical composition and diagnostic physical properties of rock-forming minerals mentioned below:
quartz, orthoclase, microcline, albite, labradorite, nepheline, muscovite, biotite, augite, hypersthene, hornblende, olivine, talc, chlorite, apatite, calcite, dolomite, garnet, kyanite,
2. Optical properties of some common rock-forming minerals (Quartz, Plagioclase, Orthoclase, Microcline, Biotite, Muscovite, Hornblende, Hypersthene, Augite, Garnet, Olivine, Calcite & Tourmaline).

Mark distribution of practical for end semester examination

1. Experiment 1	5
2. Experiment 2	5
3. Minor experiment	3
4. Laboratory record	3
5. Viva voce	4
TOTAL	20

Suggested Readings

1. Berry, L.G., Mason, B. and Dietrich, R.V. (1982): Mineralogy, CBS Pub.
2. Dana, E.S. and Ford, W.E. (2002): A textbook of Mineralogy (Reprints).
3. Nesse, D.W. (1986): Optical Mineralogy, McGraw Hill.
4. Phillips, F.C (1971): Introduction to Crystallography, Longman Group Pub.
5. Read, H.H. (1968): Rutley's Element of Mineralogy (Rev. Ed.), Thomas Murphy and Co.
6. Correns, C.W. (1969): Introduction to Mineralogy: Crystallography and Petrology, Springer
7. Okrusch, M. (2000): Mineralogy: An Introduction to Minerals, Rocks, and Mineral Deposits, Springer
8. Kerr, P.F. (1977): Optical Mineralogy, McGraw-Hill Inc.

GENERAL GEOLOGY

GEOL/MJ/101

Credits: 4 (Theory)

Objective of the Paper

This course is designed to provide the knowledge of the development of the Earth's crust, its minerals, rocks, volcanoes, glaciers, mountains, and continents. This course provides an understanding of the natural and physical processes of the planet Earth and an appreciation for the impact geology has on everyday life.

Unit 1

Introduction to geology, branches of geology. Origin of the universe; Big Bang theory. Origin of the solar system; Nebular, tidal and planetesimal hypotheses. Earth; size, shape, mass, density, rotational and revolution parameters.

Unit 2

Internal constitution of the earth, core, mantle and crust; Elementary ideas on Continental Drift and Plate Tectonics. Mantle convection, earth's magnetic field, sea floor spreading. MidOceanic ridges and Trenches.

Unit 3

Earthquakes; elastic rebound theory, causes, measurement, epicenter and focus. Effects of earthquakes, world distribution of earthquake belts. Types of Seismic waves and location of earthquake.

Unit 4

Magma and its types; Volcanos, types of volcanic eruption, effect of volcanos & Volcanic landforms. Landslide; types, causes and its remedial measures. Cyclone and Tsunamis

SUGGESTED READINGS

1. Holmes, Arthur (1992): Principles of Physical Geology, Vol. 1, Chapman and Hall, London.
2. Leet, L.D. and Judson, S. (1969): Physical Geology, Prentice Hall.
3. Condie, K.C. (1997): Plate Tectonics, 4th Edition, Elsevier
4. Kearey, P. (1990): Global Tectonics, 3rd Edition, Wiley
5. Shearer, P.M. (2019): Introduction to Seismology 3rd Ed., Cambridge
6. Udías, A. & Buforn, E. (1999): Principles of Seismology, Cambridge University Press
7. Clague, J.J. (2012): Landslides: Types, Mechanisms and Modeling, Cambridge
8. Werner, E.D. & Friedman, H.P. (2010): Landslides: Causes, Types & Effects, Nova Science Publishers Inc;