NORTH MAHARASHTRA UNIVERSITY, JALGAON.

GEOLOGY

SYLLABUS FOR FIRST YEAR BACHELOR OF SCIENCE DEGREE FROM 1991-92

SCHEME OF THE SYLLABUS :

Paper I

Term I : Mineralogy
Term II : Petrology

Paper II

Term I : General Geology
Term II : Principles of Palaeontology

Paper III

Practicals Based on Theory

SYLLABUS FOR FIRST YEAR BACHELOR OF SCIENCE IN GEOLOGY

WITH EFFECT FROM JUNE, 1992.

MINERALOGY

Paper I Mineralogy and Petrology

Term I :

Introduction :

a) Definition of the Mineral,
b) Geological processes of mineral formation,
c) Chemical affinity of the elements is the formation of minerals,
d) Silicate structures - definition, Types of silicate structures with their unit formulae,
e) Classification of minerals

Physical Properties:

a) Specific gravity, methods to determine specific gravity of minerals,
b) Cleavage and Fracture,
c) Hardness,
d) Forms of minerals,
e) Characters dependent on light - color, streak, luster, flouresence, phosphorescence,
f) Magnetic properties,
g) Electric properties, - piezoelectric, pyroelectric.
h) Radioactivity of minerals
i) Thermal conduction,
j) Electronic conduction,

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k) Elasticity

Crystallography:

a) Definition of crystal
b) Crystal growth
c) Solution and melting
d) Interfacial and solid angles
e) Crystal morphology
f) Law of Constancy of Interfacial angles
g) Symmetry elements of crystals
h) Parameters - (System of Weiss) and Indices (System of Miller)
i) Law of Rational Indices
j) Axial ratio crystallographic Natations.
k) Classification of crystals of Normal class
l) A comparative study of elements of symmetry, and forms with indices of Cubic (Galena Type), Tertagonal (Zircon Type) and Orthorthomibc (Baryte Type) Systems

Characteristic features and important mineral species of the following mineral groups :-

FELSPAR, SILICA, PYROXENE, AND AMPHIBOLE

MINEYAL OPTICS :

a) Nature of light - Plane polarised light, construction of Nicols prism
b) Double refraction of light,
c) Properties in plane polarised light - color, form, cleavage, cracks relief, pleochroism and twinkling.
d) Properties between crossed polarsised isotropism, anisotropism extinction, interference colous.

Petrology

Term II.

Definitions of the terms Petrography, Petregenesis, Petrology, and Lithology. (3)

Major divisions of rocks and their diagnostic characteristics. The Rock cycle. (4)

IGNEOUS PETROLOGY : (14)

a) Forms of Igneous bodies (Intrusive and Extrusive)
b) Distinction between contemporaneous lava flows and sills
c) Factors controlling textures of igneous rocks
d) Common textures - granitic, porphyritic, and glassy.
e) Common structures - vesicular, amygdaloidal, ropy and pillow.
f) Magma and its composition, including
Tabular Classification of igneous rocks - following rock

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types - Granite, syenite, gabbro, dolstite, pitchstone, rhyolite, basalt, pegmatite, graphic granite.

SEDIMENTARY PETROLOGY : (12)

a) Formation of sediments - chemical and mechanical derivation, transportation and causes of deposition of sediments, Types of Sedimentary rocks,
b) Classification of sediments based on grain size, classification of sedimentary rocks based on transportation.
c) Common textures of sedimentary rocks (clastic and non clastic)
d) Primary features of sedimentary rocks (stratification, graded bedding, current bedding, and ripple marks).

METAMORPHIC PETROLOGY :

a) Matamorphism, Definition, agents and kinds of metaorphism and their characteristics with examples
b) Structures of metamorphic rocks - schistose, genissose, and gramulose.

Paper II General Geology and Principles of Palaeontology

Term I : General Geology

1. Scope and subdivisions of Geology
2. History of the Earth
   a) Origin of the Earth
   b) Internal structure of the earth
   c) Age of the earth
3. Concept of Geological Time Scale
   a) Divisions and subdivisions
   b) Major events in earth's history
4. Isotacy
   a) Definition
   b) Airy's and Pratt's hypothesis
5. Mountain building processes
   a) Types of mountains
   b) Mountain building processes in short
6. Volcanoes
   a) Types of eruptions
   b) Products of valcanoes

7. Earthquakes
   a) Causes
   b) Types of earthquakes waves
   c) Ritcher's scale
   d) Seismograph

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8. Continental Drift, Wegners hypothesis
   a) Polar wandering
   b) Sea floor spreading
   c) Place tectonics
   d) Convection current theory

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9. Geosynelines
   a) Definition
   b) Parts of geosynlines as given by Holmes

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10. Ice Ages
    a) Precambrian
    b) Permocarboniferous
    c) Pleistocene

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PRINCIPLES OF PALAEONTOLOGY

TERM II

1. Definition and branches of Palaenotology

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2. Fossils
   a) Definition
   b) Conditions of fossilization
   c) Modes of preservation of life
   d) Techniques of collection, preservation, illustration and discription of fossils
   e) Uses of fossils

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3. Systematic position, geological and geographical distribution and study of morphology of hard parts of the following :- 30
   a) Phyllum Mollusca Class : Bivalvia : shell, ornamentation and types of hinge lines
   b) Phyllum Mollusca, Class : Gastrophod - Morphology, forms and ornamentation of shell
   c) Phyllum : Mollusca, Class : Cephalopoda - morphology of hard parts of Nautiloick, Ammonoids, Belemnites, Types of suture lines.
   d) Phyllum : Brchipoda - Hard pars of lass Articulate and Inarticulate Brachial skeleton an types.
   e) Phyllum : Echinodermate Class : Echinoidea - hard parts of Regularie and Irregularia. Variation in the Apical disc in Echinoids.

f) Phyllum Arthropoda Class : Tribobita hard parts of Trilobites.

g) Phyllum: Coelentarate Class: Anthozoa - Order: Zoantarial - Hard parts of Madriporaria, Montilivaltia, Calaeola.

i) Graptolites.

PAPER II

PRACTICALS

1. Physical Properties of Minerals - color, streak, lustre, cleavage, fracture hardness, form and uses of the following minerals :-
Quartz and varieties, orthocalse, microcline, talc, muscovite biotite, hornblende, augite, beryl, tourmaline, olivine, kyanite, garnet, gypsum apatite, fluorite, calcite, corundum

ORE MINERALS :

1. Pyrite, Chalcopyrite, galena haematite, manesite, graphite, malachite bauxite.
2. Determination of specific gravity of minerals by Walker's Steel yard balance and Jolly's Spring Balance.
3. Crystallography - Study of elements of symmetry, and forms with indices
   a) Cubic (Galena) system
   b) Tetragonal (Zircon) system
   c) Orthorhombic (Baryte) system
4. Use of contact Goniometer
5. Optical properties of the minerals
   a) in plane polarised light
   b) in crossed polarised light (between crossed nicols)
6. Construction of petrological microscope
   a) difference between pertological and biological microscopes
7. Study of countour maps
8. Study of geological maps of horizontal strata
9. Reading of toposheest,
10. Palaeontology Study of two specimens of each phyllum. The total should not be less than 15.
11. Petrology - Megascopic study of typical igneous, sedimentary and metamorphic rooks

a) Igneous rocks
1 Granite
2 Gabbro
3 Basalt
4 Pegmatite
5 Rhyolite

b) Metamorphic rocks
1 Slate
2 Marble
3 Quartzite
4 Mica schist
5 Mica garnet schits
6 Hornblende schost and gneiss
7 Biotite gneiss

c) Sedimentary rocks
1 Conglomerate
2 Breccia
3 Sand stone and its varieties
4 Shale
5 Mudstone
6 Limestone
7 Organic limestone.

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Gg 101 : F.Y.B.Sc. Practicals

Unit	Sub-unit	Areas to developed	Periods
(1) Interpretation of Toposheets.	Introduction to the Toposheets (SOI)	To acquire the skill of reading topographical maps.	4
	Indexing of the Toposheets and Marginal Information of the Soi	To understand the meaning of Grid.	4
	Toposheets. Grid and Grid references.	To practice finding out the object with the help of gird references.	4
	Information about Toposheets: 1 : 1000,000 1 : 250,000 1 : 50,000 1 : 25,000 sheets		
Scales.	V.S. R.F. Simple graphical scale.	To acquire the skill of constructing the three types of scale	6
(2) Contourmaps	Forms of Relief representation: Confour Patterns for various relief features.	To identify various relief features on map (only frequently occuring features).	6
	Cross profiles, Longitudinal. Profiles inter visibility. Map Reading (at least two toposheets).		8
	(i) Hilly and Mountainous area. (ii) Plain area		8
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1	2	3	4
(3) Weather Maps.	Information about I.M.D. weather maps with weather symbols. Representation of weather data Bor and Line graph Isotherms, Isobars and Isohytes	(1) To acquire the knowledge of Indian daily weather report. (2) To understand the meaning of signs and symbols in weather chart. (3) To develop the skill of drawing the signs and symbols.	4
(4) Weather Instruments	Functions and Mechanism and use of following weather instruments	(1) To acquire the knowledge of measurement of temperature pressure humidity wind velocity, precipitation.	
	Temperature (A) : (1) Thermometers. (2) Maximum and minimum Thermometer. (3) Thermograph	(2) To acquire the knowledge of all the different types of weather instruments.	4
	Pressure (B) : (1) Barometers Aneroid and	(3) To understand the principle construction working, uses and draw backs of the instruments.	
	(2) Barograph.	(4) To develop the mathematical skill of solving the problem.	4
	Humidity (C) : (1) Hair Hygrograph. (2) Dry' Wet bulb thermometer. (3) Hair Hygrometer.	(5) To develop the skill of systematic drawing of the instruments and naming the different parts.	4
	Winidity (D) : (1) Wind Vane. (2) Cup Anemometer.	(6) To develop the skill of readings of temp press, humidity, ppt. wind velocity and skill of reading diff. types of graphes.	4

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Unit	Sub-unit	Areas to developoled	Periods.
	Rainfall (E) :		
	(1) Rain Guage Patterns.	(1) To understand the meaning of isobars.	4
	(2) Isoberic Patterns Cyclones, Wedege, Trough etc.	(2) To develop the skill of drawing issbaric shapes and patterns.	
	(3) Reading of weather maps (One each for summer, weather and rainy season)	(1) To acquire the knowledge of Indian daily weather report.	8
		(2) To develop the skill of correct representation of the weather reports to read the report.	8
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List of Books:

(1) Mapwork and Practical Geography- Singh and Kanauja.
(2) Geographical Interpretation of Indian Topographical maps - Tamaskar and Deshmukh.
(3) Map Interpretation-R. Ramamurty.
(4) Map Interpretation - Dury.
(5) Practicals in Geography - Singh and Dulla.
(6) Map work - Bigat.

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