NORTH MAHARASHTRA UNIVERSITY, JALGAON

SYLLABUS FOR M.Sc. GEOLOGY

(W.E.From June,1994)

SEMESTER-I (All Courses Compulsory)

GL : 101 Crystallography and Mineralogy.

GL : 102 Principles of Stratigraphy & Palaeontology

GL : 103 Sedimentology.

GL : 104 Practicals related to Mineralogy, Crystallography and Optics.

GL : 105 Practicals related to Sedimentary Petrology and Palaeontology.

SEMESTER-II (All Courses Compulsory)

GL ; 201 Igneous Petrology.

GL : 202 Metamorphic Petrology.

GL ; 203 Structural Geology & Geotectonics.

GL : 204 Practicals related to Igneous Petrology.

GL : 205 Practicals related to Structural Geology & Metamorphic Petrology.

SEMESTER-I

GL : 101 - Crystallography and Mineralogy

Formation and growth of crystals; Forms of crystal growth The law of constancy of angles and measuring of crystal concept of crystal symmetry; Derivation of all possible symmetry classes in crystals. The law of rational indices and grouping of crystal classes into systems Crystal structure; Space lattice and unit cell Use of X-ray diffraction in crystallographic and mineralogic studies.

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Important optical and physical properties of minerals and Their variation with chemical composition and conditions formation. Concept of optical indicatrix and interference figures: pleochroism and disperision.

Structure and Chemical composition of important silicate, oxide, carbonate and sulfide mineral groups. Isomorphism in solid solution; Ionic substitution; Polymorphism, (Coordination number Electronegativity; ionic and covalent bonding; Introduction to equilibrium thermodynamics in solids and its relavance.

GL-102 : Principles of Stratigraphy and Palaeontology :-
History of development of stratigraphy, stratigraphic procedures, concepts of lithofacies and biofacies, Stratigraphic correlation study of standared stratigraphic code.

Palaeontology : Collection, preparation, preservati and maintenance of palaeontological record; Types of microfossils; Application of micropalaeontology in Palaeoecology and correlation Principles of palaeobotany palynology and ichnology; Gondwana and Inter trappean floras; Hard part morphology classification evolution, stratigraphic range and distribution of logy classification, evolution, stratigraphic range and distribution of fishes, dinosaurs, anthropoids, equides, proboscidae groups.

GL-103 : Sedimentology

Field procedures in sedimentary petrology, the geologic cycle, sediment movement by fluid flow; sedimentary structures; Sedimentary textures, Concept of Sedimentary facies, Sedimentary depositional environments, Terrigenous clastic sediments; characteristics, classification and genesis, Carbonate rocks and evaporites, Characteristics and genesis, Phosphorites, Cherts, Iron and Manganese rich sediments. External controls of Sedimentation Tectonics and sedimentation. Palaeocurrent and basin analysis, Sedimentary geochemistry as a tool to understand tectonics etc.

GL-104 : Practicals.

Study of rock forming minerals in handspecimens and thin sections; Optical properties of uniaxial and biaxial minerals study of pleochroism, Determination of refractive indices of the minerals, Twin laws, Anorthite content of plagioclasses, Crystal chemical calculations pertaining to mineral composition. Use of contact goniometer

for measurement of crystal angles stereographic and Gnomonic projections, Calculation of axial ratios.

Practicals for GL-105 :

Palaeontological techniques in study of mega and microfossils, study of important genera of invertebrate, vertebrate and plant fossils and of microfossils.

Study of handspecimens and thin sections of sedimentary rocks; size and shape analysis heavy mineral and insoluble residue analyses; Calculation of different sedimentological paramaters and their ploting, Study of sedimentary structures & trace fossils.

SEMESTER-II

GL-201 : Igneous Petrology :

Magmas and their nature, cooling behaviour, properties and Chemistry, Classification of Igneous rocks. Textures and structures of Igneous rocks, Magmatic evolution, Crystallisation paths of igneous minerals at low pressures. The source of magma; Basaltic associations of ocean basines, continental Tholeitic basalts. Andesites and associated volcanics of Island arcs and continental margins. Continental mafic and ultramafic rocks-Rocks of continental plutonic provinces.

GL-202 : Metamorphic Petrology :

Scope and classification of metamorphism; characteristics of metamorphic reactions, phase rule and its application, Progressive contact and regional metamorphism of sedimentary and igneous rocks Cataclastic metamorphism, Facies concept and its evolution, Characteristics of important metamorphic facies; Experimental appraisal of critical metamorphic reactions ; Metasomatism, anatexis and metamorphic differentiation; Conce of paired metamorphic belts.

GL-203 : Structural Geology and Geotectonics :

Behaviour of rock materials under stress; Analysis of strain classification and genesis of folds, lineations, foliations and joints Faults and mechanism of faulting Tectonic fabric and symmetry Structural analysis on mesoscopic microscopic and macroscopic scales; Lineament analysis.

Fundamental concepts of geotectonics; Mid-oceanic ridges; Island arc-oceanic trench systems; Tectonics of mountain ranges continental drift and plate tectonics, Tectonic framework of India.

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Study of igneous rocks in hand specimens and thin sections Calculation of Niggli values and CIPW norms Plotting of chemical data on different variation diagrams for evaluation of magma and rock types, Structural problems.

GL-205 : Practicals

Study of metamorphic rocks in hand specimens and thin sections metamorphic mineral assemblages with respect to metamorphic facies and grades study of prograde and retrograde metamorphism Plotting of chemical data of ACF and AK diagrams Calculation of pressure temperature conditions from composition of typical co existing minerals assemblages.

Solution of structural geology problems by orthographic and stereographic methods; Completion of outcrops; Drawing of structural sections and interpretation of geological maps; Plotting and Interpretation of measoscopic and microscopic structural data;

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