DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Syllabus of

B.Sc. Second Year

[Geology]

Semester- III & IV

(Effective from June-2010 – 2011 & onwards]

Semester IV
Paper – XIII – Sedimentary and Metamorphic Petrology

Sr. No.	Syllabus	No. of Lectures
1.	Mineral composition of sediments. Concept of interstitial matrix and cementing materials and their effect on porosity and permeability	5
2.	Textures of sedimentary rocks wentworth and udden grade scale, roundness and sphericity kind of transport of sediments	5
3.	Lithification and diagenesis. Brief outline of diagenetic processes. Important mechanical and chemical structures found in sedimentary rocks	8
4.	Study of following secondary deposits with respect to their texture / structure mineral composition and varieties a) Residual Laterite, Bauxite and soil b) Rudaceous conglomerate and Breccia c) Arenaceous – sandstones d) Argillaceous – shales and Mud stone e) Chemical deposits f) Organic deposits	10
5.	Metamorphism, Difference between diagenesis, metamorphism and metasomatism. Metamorphic minerals textures of metamorphic rocks.	2
6	Metamorphism and Metamorphic products a) Regional metamorphism of i) Argillaceous rocks ii) Quartzofelspathic rocks iii) Basic igneous rocks b) Cataclasis, crush breccia, crush conglomerate, cataclasite c) Thermal metamorphism of i) Pure and impure limestones ii) Arenaceous rocks	15
	Total No. of Lectures	45

Books

1. Principles of Petrology — G. W. Tyrrel
2. Sedimentary Rocks — Pettijohn
3. Igneous and metamorphic Petrology — Turner and Verhoogen
4. Petrology for students — A Harkar
5. Petrology for students — S. R. Mockolds
6. Petrology of igneous sedimentary and metamorphic - E. G. Ehlers
7. Petrology -"- Metamorphic H. Blatt

8. Igneous and Metamorphic Petrology - M.Y.G. Best
9. An introduction to Sedinentology - R. C. Salley
10. Petrography - H. Williams

Semester IV

Paper – XIV – Structural Geology and Palaeonlogy

Sr. No.	Syllabus	No. of Lectures
1.	Introduction to structural Geology A) Definition and its relation with other branches of Geology B) Tectonic and non-tectonic structures	2
2.	Planar, Linear Structures outlier and inlier a) Attitude of planar feature strike and dip b) Attitude of linear features; bearing plunge and rake of linear feature in given planar feature. c) Outlier and inlier definition and genesis d) Clinometer compass and its application.	3
3.	Folds : a) Definition, nomenclature of folds. b) Classification of fold geometric, genetic and nontectonic folds	8
4.	Joints a) Definition and nomenclature of joints b) Geometric and genetic classification of joints with examples	3
5.	Faults a) Definition and nomenclature related to faults. b) Different types of movement along fault c) Geometric and genetic classification of fault. Recognition of faults in the field and geological map.	10
6.	Unconformity Definition, stages in the development of unconformity structural classification of unconformities Recognition of unconformity in the field	6
7.	Determination of top and bottom of a bed with the help of primary structures and interpretation of major structure with which they are associated	3
8.	Palaeontology a) Significance of fossils, index and zonal guide fossils b) Morphological features of trilobites and graptolites. Their geographical distribution and geological history c) Introduction to Gondwana plant fossils. d) Introduction to micropalaeontology significance of microfossils in correlation of petroliferous strata	10
	Total No of Lectures	

Books

1. Structural Geology M. P. Billings
2. Structural Geology Desitter
3. Structural Geology Nevin

4.	Text Book of Engineering and general Geology	Prabin Singh
5.	Invertebrate Palaeontology	Henry Wood
6.	Elements of Micropalaeontology	G. Bignot
7.	Principle of palaeonotology	David Romp
8.	Principle of palaeonotology	Uliver

Semester IV

Practical Paper – XV – Sedimentary and Metamorphic Petrology

Sr. No.	Syllabus	No. of Practicals
1.	In addition to the syllabus of B. Sc. Ist. year Megascopic study of the following sedimentary rocks and their identification, gragwacke, grit, flagstone, carbonaceous shale Black limestone, Shelly limestone, coral limestone.	4
2.	In addition to the syllabus of Ist year Magascopic study of the following metamorphic rocks and their identification. Pink marble, Serpentine marble, Sachharoidal marble, Mica granet schist, Fuchsite quartzite, Staurotite schist, kyanite schist, Hornblende Biotite gneiss, granite gneiss, Augen gneiss Banded gneiss, Amphibolite schor rock.	5
3.	Microscopic study of the following rocks and their identification. Sandstone, ferruginous sandstone. Limestone, organic limestone, Marble, quartzite, Muscovite schist, chlorite schist, Honblende schist, Hornblende Biotite gneiss, Augen gneiss, staurolite schist, Garnetiferous mica schist.	6
	Total No of Practical	15

Semester IV

Practical Paper – XVI– Structural Geology and Palaeontology

Sr. No.	Syllabus	No. of Practicals
1.	Study of Geological maps; inclined beds, unconformity igneous intrusions, fold and fault. Structural problem. Attitude of beds or orthographic and stereo graphic problems.	8
2.	Study of the following invertebrate fossils and their identifications Lamellibranchia - Gryphaea, exogyra, ostrea, Alectryonia, Pecten, Inoceramus Gastropoda – Physa Cephalopoda - Nautilus, Perisphinetes, Goniatites, Ceratites, Acanthoceras, Phylloceras, Beleminites Brachiopoda - Products, spirifer, Lingula Echinoidea - Cidaris, Micraster Trilobita - Phacops , Calymene, Paradoxides Gondwana plant fossils Glossopteris, calamities ptillophyllum, Gangamopteris vertebraria	7
3.	Geological excursion of one week in selected area, Report writing and sample collection.	
	Total No. of practicals	15

B.Sc. Geology Second Year

Semester III

Paper – IX Physical – Mineralogy and Igneous Petrology

Sr. No.	Syllabus	No. of Lectures
1.	Broad outline of crystalline and non-crystalline minerals	2
2.	Classification of minerals based on chemical compositions classification of silicates	2
3.	Study of the following rock forming silicates groups 1. Olivine 2. Pyroxene, 3. Amphibole 4. Mica 5. Chlorite 6. Felspar 7. Silica 8. Felspathoid, Secondary minerals in basalt.	18
4.	Physico-chemical constitution of magma Diversity of Igneous rocks. Concept of Primary magma. Crystallization of unicomponent, bicomponent and ternary magma Bowens reaction series.	8
5.	Igneous textures and microstructures a) Definition, factors determinative of textures of rock. b) Study of various textures with respective characters and genesis c) Study of various structures and microstructures with respect to characters and genesis	8
6.	Study of basic and ultra basic rocks fractional crystallization of basaltic and granitic magma	7
	Total No. of Lectures	

Books

1. Text book of Geology — Mahapatra
2. Ruttey's Elements of Mineralogy — H. H. Read
3. Mineralogy — I. G. Berry and B Mascon
4. Crystal Minerals and rocks — K. G. Cox
5. A Text book of mineralogy — E. S. Dana
6. Rock forming Minerals — Deer, Howie Zussman
7. Mineralogy and Petrography — A. V. Milorsky
8. Principles of Petrology — G. W. Tyrrel
9. Petrology Igneous Sedimentary and Metamorphic — E. G. Ehler
10. Igneous and Metamorphic Petrology — Turner & Verhogen

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Semester III

Paper – X Crystallography and optical mineralogy

Sr. No.	Syllabus	No. of Lectures
1.	Definition of crystal. Crystallographic and geometrical symmetry. Imperfections in crystals. Law of constancy of Interfacial angle.	4
2.	Study of elements of symmetry and forms occurring in hemihedral classes a) Cubic System : Pyrite type and Tetrahedrite type b) Hexagonal System : Calcite type, Quartz type and tourmaline type	10
3.	Concept of hemrihedrism hemimorphism enantiomorphism, Tetartahedrism, Definition of twinning, Twinning laws in different crystal classes	6
4.	Nature of light Ordinary and plane polarized light Double refraction. Nicol prisms their construction and function. Different parts of petro logical microscope and their function	8
5.	Optical properties of minerals as viewed under plane polarized light and cross nicols isotropism and anisotropism	8
6.	Types of extinction. Extinction positions of minerals in different crystal system	2
7.	Observation of mineral sections under conoscopic light study of uniaxial and biaxial interference figures	7
	Total No. of lectures	45

Recommended books

1. Optical Crystallography — Wahistrom
2. A hand book of minerals, Crystals, Rocks and ores — Pramod Alexander
3. Optical Mineralogy — Winchell
4. Optical Mineralogy — Royer and Kerr
5. Crystals, Minerals and Rocks — K. G. Cox

Semester III

Practical Paper – XI Physical Mineralogy and Igneous petrology.

Sr. No.	Syllabus	No. of Practicals
1.	Physical mineralogy : In addition to B.Sc. Ist year megascopic identification of following minerals with the help of physical properties. Apatite, Topaz, Corundum, Tour maline, Andalusite sillimanite, olivine, staurolite, Chlorite, Asbestos, phlogopite, lepidolite Epidote, Rhodonite, Soda lite serpentine, wavellite hypersthene Thomosnite Natrolite.	6
2.	Igneous petrology In addition to B. Sc. 1st megascopic study of the following igneous rocks. Diorite, Syenite, Dunite, Peridotite Norite, Pegmatite, Graphic granite dolerite lamprophyre, Trachyte Andesite and varieties of basalt. Study of thin section of following igneous rocks Granite, Porphyritic Granite, Diorite, Syenite, Rhyolite, Andesite, Basalt, Porphyritic basalt, Amygdaloidal basalt, Trachyte, Dolerite, Gabbro	9
	Total Practicals	15

B.Sc. Geology Second Year

Semester III

Practical Paper – XII Crystallography and optical mineralogy.

Sr. No.	Syllabus	No. of Practicals
1.	Crystallography Study of axial characters, elements of symmetry and forms occurring in the crystal models belonging to the five lower symmetry classes pyrite type, Tetrahedrite type calcite type tourmaline type and quartz type	5
2.	Study of models related to twinning laws in the six crystal systems (only common twin models)	2
3.	Identification of following mineral sections with the help of optical properties under petrological microscope Quartz, orthoclase, plagioclase, Microcline calcite Augite, Diopside Hornblende muscovite Biotite sillimanite kyanite Oliveine Garnet chlorite	5
4.	Identification of uniaxial and Biaxial Interference figures under conoscopic light	3
	Total Practicals	15