**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**

**CIRCULAR NO.ACAD/NP/B.Sc.-Ist Yr./SEM.-I & II/157/2013**

It is hereby notified for information of all concerned that, on the recommendations of the Boards of Studies, Ad-hoc Boards, and Faculty of Science, the **Academic Council at its meeting held on 25-03-2013** has accepted the **following revised syllabi for B.Sc. First Year progressively under the Faculty of Science** :-

| *Sr. No.* | *Revised Syllabus* | |
|---|---|---|
| *[1]* | *B.Sc. [Physics]* | *Semester- I & II,* |
| *[2]* | *B.Sc. [Dairy Science & Technology]* | *Semester- I & II,* |
| *[3]* | *B.Sc. [Industrial Chemistry]* | *Semester- I & II,* |
| *[4]* | *B.Sc. [Geology]* | *Semester- I & II,* |
| *[5]* | *B.Sc. [Chemistry]* | *Semester- I & II,* |
| *[6]* | *B.Sc. [Botany]* | *Semester- I & II,* |
| *[7]* | *B.Sc. [Electronics] Science* | *Semester- I & II,* |
| *[8]* | *B.Sc. [Fisheries]* | *Semester- I & II,* |
| *[9]* | *B.Sc. [Microbiology]* | *Semester- I & II,* |
| *[10]* | *B.A. [Statistics]* | *Semester- I & II,* |
| *[11]* | *B.Sc. [Statistics]* | *Semester- I & II,* |
| *[12]* | *B.Sc. [Zoology]* | *Semester- I & II,* |
| *[13]* | *B.Sc. [Textile and Interior Decoration]* | *Semester- I & II,* |
| *[14]* | *B.Sc. [Home Science]* | *Semester- I & II,* |
| *[15]* | *B.A. / B.Sc. [Mathematics]* | *Semester- I & II.* |

This is effective from the **Academic Year 2013-2014** and onwards.

These **syllabi are available on the University Website www.bamu.net**

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,
Aurangabad-431 004.
REF.NO.ACAD/NP/B.SC.-IST YEAR/
Sem-I & II/2013/5132-541
**A.C.S.A.I.No.327[9].**

Date:- 08-05-2013.

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**Director,**
**Board of College and University Development.**

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**Copy forwarded with compliments to :-**

1] **The Principals, affiliated concerned Colleges,**
**Dr. Babasaheb Ambedkar Marathwada University.**

2] The Director, University Network & Information Centre, UNIC, with **a request to upload the above all syllabi on University Website [www.bamu.net].**

**Copy to :-**

1] The Controller of Examinations,

2] The Superintendent, [B.Sc. Unit],

3] The Superintendent, [B.A. Unit],

4] The Superintendent, [Eligibility Unit],

5] The Programmer [Computer Unit-1] Examinations,

6] The Programmer [Computer Unit-2] Examinations,

7] The Director, [E-Suvidha Kendra], in-front of Registrar's Quarter,
Dr. Babasaheb Ambedkar Marathwada University,

8] The Public Relation Officer,

9] The Record Keeper,
Dr. Babasaheb Ambedkar Marathwada University.

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# DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

## Revised Syllabus of

## B.Sc. Ist Year

## GEOLOGY

## SEMESTER-I & II

*[ Effective from 2013-14 & onwards ]*

# DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGBAD

## Course Structure

| YEAR | SEMESTER | PAPER NUMBER | PAPER TITLE | Hours | MARKS |
|---|---|---|---|---|---|
| First | I | Paper – I | **Mineralogy and Crystallography** | 45 | 50 |
| | | Paper - II | **General Geology & Structural Geology** | 45 | 50 |
| | | Paper - III | **Practical** | 22 | 50 |
| | II | Paper – IV | **Petrology** | 45 | 50 |
| | | Paper – V | **Paleontology** | 45 | 50 |
| | | Paper – VI | **Practical** | 22 | 50 |
| | | | | **224** | **300** |

# Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

## Semester-I
## Paper I: Mineralogy and Crystallography

| Sr. No. | Syllabus | Total Periods | Marks |
|---|---|---|---|
| 1. | Introduction: Definition, braches and Scope of mineralogy, Importance and conservation of minerals. | | |
| 2. | Formation of minerals:<br>Introduction and description of geological processes of mineral formation<br>a) Crystallizations from melt<br>b) Crystallization from Solution (Evaporation and precipitation)<br>c) Crystallization from Vapour (Sublimation)<br>d) Metamorphic processes and metamorphic minerals | (5) | 10 |
| 3. | Crystal Chemistry<br>a) Bonding forces in crystals: Ionic, Covalent, Vander Waal's and metallic bonds, crystals with more than one type of bond.<br>b) Major element constituents of minerals<br>c) Geochemical affinity & classification of element<br>d) Geometrical and electrical stability of minerals concept of relative size of ions, radius, rations, co-ordination number & ionic substitution.<br>e) Isomorphism, polymorphism, pseudo orphism.<br>f) Silicate structures. | (12) | 10 |
| 4. | **Physical properties of minerals**<br>a) Colour, streak, luster, cleavage, fracture, hardness, form, magnetism, electrical property, radio activity, specific gravity & luminescence (phosphorescence and Fluorescence)<br>b) Methods of determining specific gravity-Chemical balance, Walker's steelyard, Jolly's spring balance, psycho meter, heavy liquids. | (7) | 10 |

| | | | |
|---|---|---|---|
| 5. | **Crystallography**<br>a) Definition and conditions conductive for the formation of crystals, crystal habits and aggregates.<br>b) Crystal morphology-faces, forms, edges, solid angles, interracial angle and its measurement by contact Goniometer, law of constancy of interracial angle.<br>c) Symmetry of crystals-Plance, axis and centre of symmetry, crystallographic and geometric symmetry. Crystallographic axes, lettering and order of crystallographic axes, parameters, axial ratio, indices, parameter system of<br>d) Classification of crystals based on their elements of symmetry and crystallographic axes. The study of following crystal stystems:<br>i) Orthorhombic (Type: Baryttes)<br>ii) Tetragonal (Type: Zircon)<br>iii) Cubic (Type: Galena)<br>iv) Hexagonal (Type: Beryl)<br>v) Monoclinic (Type: Gypsum)<br>vi) Triclinic (Type: Axinite)<br>Comparative studies of all the six crystallographic systems | 19 | 20 |
| | **Total Number of Lectures** | (45) | 50 |

## Semester-I, Paper II: General Geology & Structural Geology

| Sr. No. | Syllabus | Total | Marks |
|---|---|---|---|
| 1. | **Introduction:** Definition, of geology, Its divisions, sub-divisions and scope | 1 | |
| 2. | **Planet Earth:** Position of Earth in universe & Solar system.<br>a) Earth: Its orgin size, shape and density. Temperature, pressure and magnetism within the earth.<br>b) Age of the Earth: A brief account of the historical methods. Determination of age by the K/Ar and U/Th methods | (1)<br>(4) | 5 |
| 3. | a) The Earth's Atmosphere, Hydrosphere, Lithosphere and Biosphere.<br>b) Earth's crust, mantle and core | (2) | **03** |
| 4. | Continental Drift: Concept and evidence, plate Tectonics a Broad out line | (3) | |
| 5. | Wealthering (Mechanical and chemical); erosion, denudation, soil formation and soil profile. | (2) | |
| 6. | The dynacmis of erosional and depositional landforms resulting from the action of rivers, wind, and glaciers | (11) | 15 |
| 7. | Concept of Isostacy: Pratt's and Airy's model | (2) | **02** |
| 8. | Types of Mountains: Fold, fault block volcanic and residual moan tins | (2) | |
| 9. | Volcanoes: Genesis of volcanoes, Central and fissure type of eruptions. Products of volcanic, activity volcanic belts on the earth. | (3) | |
| 10. | Earthquakes: Definition, terminology, causes, intensity and magnitude. Recording of earthquakes. Use of seismic waves in internal structure. Seismic Zones. History and susceptibility of the Indian subcontinent to earthquakes. | (4) | 05 |
| 11. | **Structural Geology:**<br>a) Definition, scope, study of outcrop, identification of bedding. Attitude of beds contojur map and its interpretation<br>b) Broad outline of fold, fault and unconformity. Study of different types of joints. | (10) | 20 |
| | **Total Number of Lectures** | (45) | 50 |

# Semester-I, Practical Paper-III
# [ based on Paper-I & II ]

| Sr. No. | Syllabus | Total | Marks |
|---|---|---|---|
| 1. | **Mineralogy**<br>a) Physical properties of minerals colour, form, streak, luster, cleavage, fracture, hardness and specific gravity.<br>b) Megascopic Identification of following mineral (with the help of physical properties) Quartz, Rock Crystal, Rose Quartz, Milky, Quartz, Smoky quartz, Amethyst, Chalcedony, Agate, jasper, Flint, Opal, Orthoclase, Plagioclase, Biotite, Muscovite, Garnet, Olivine, Hornblende, Apophyllite, Stilbite, Kyanite, Talc, Calcite, Fluorite, Gypsum, Barytes, Magnetite, Haematite, Chromites, Chalcopyrite, Galena, Pyrolusite, Bauxite, Graphite. | 11 | 25 |
| 2. | **Experiment:**<br>To find out the specific gravity of minerals using Walker's Steel Yard | | |
| 3. | **Crystallography:**<br>Study of elements of symmetry, crystallographic axes and forms with Miller indices in the crystal models belonging to the following crystal systems (Minimum 3 models of each system)<br>a. Orthorhombic System (Type: Baryte)<br>b. Tetragonal System (Type: Zircon)<br>c. Cubic system (Type: Galena).<br>d. hexagonal system (Type: Beryl)<br>e. Monoclinic System (Gypsum)<br>f. Triclinic System (Type: Axinite) | 11 | 25 |
| 1. | **Toposheets:**<br>Reading of top sheets with reference to Topo sheet number, Latitude and Longitude, State / District, Scale Adjacent Topo sheet numbers and conventional Signs. | | |
| 2. | Introduction to topographic and geological maps. | | |
| 3. | Study of geomorphological models | | |
| | **Total Number of Lectures** | 22 | 50 |

# Semester-II, Paper-IV : Petrology

| Sr. No. | Syllabus | Total | Marks |
|---|---|---|---|
| | PETROLOGY | | |
| 1. | **Definition and major divisions:**<br>a) Definitions of petrology, Ilithology, petrography, petrogenses<br>b) Major divisions and diagnostic characteristic of rocks: igneous, sedimentary and metamorphic<br>c) Rock cycle. | 03 | |
| 2. | **Magma:**<br>a) Magma and its composition<br>b) Pyrogenetic minerals<br>c) Formation of crystals and glass | 04 | |
| 3. | **Forms of Igneous bodies:**<br>a. Intrusive: Concordant and discordant intrusions<br>i. Concordant: Sills, laccoliths, lopoliths, phaccoliths, concordant batholiths<br>ii. Discordant: dykes and veins, cone sheets, ring dykes, stock boss conolith and discordant batholith.<br>b. Extrusive: lava flows, pahohoe' and 'aa' lava. | 04 | **10** |
| 4. | **Textures and Structures of lgneous rocks**<br>a. Textures, Definition and factors controlling textures: Equigranular (granitic), Inequigranular (porphyritic), glassy.<br>b. Structures: Vesicular, amygdaloidal, blocky, pillow, flow and columnar joints.<br>c. Distinction between textures and structures. | 04 | |
| 5. | **Classification of Igneous Rocks**<br>a. Basic of classification : Chemical, mineralogical, mode of occurrence, silica percentage and type of feldspar. Tabular classification.<br>b. Description of the following igneous roks:<br>1. Plutonic: Granite, Syentie, Diorite, Gabbro, Dunite.<br>2. Hypabyssal: Pegmatite, Pitchstone, Dolerite.<br>3. Volcanic: Rhyotlite, Pumice, Bsalt, Trochyte, Andetite | 04 | **05** |

| | | | |
|---|---|---|---|
| | **SEDIMENTARY PETROLOGY** | | |
| 6. | Products of weathering Sediments, sedimentation, and formation of sedimentary rocks: denudation, transportation, deposition and lithification | 05 | |
| 7. | **Textures and structures of sedimentary rocks**<br>a. Clasite and non-clastic textures<br>b. Structures: Lamination, bedding (concordant and discordant), graded bedding and ripple marks. | 03 | **20** |
| 8. | Description and classification of the following secondary rocks: Late rite and Bauxite, Breccia, Conglomerate, Sandstones, shales, Mudstone, Limestones, coral limestone. | 02 | |
| | **METAMORPHIC PETROLOGY** | | |
| 9. | Definition of metamorphism, agents of metamorphis, kinds of metamorphism. | 02 | |
| 10. | Structure of metamorphic rocks: maculose, slaty cleavage, Schistose, Granulose, Gneissose. | 04 | **15** |
| 11. | Classification of metamorphic rocks (based on the original rock, agent / type of metamorphis) and description of following rocks. | 10 | |
| | **Total Number of Lectures** | 45 | **50** |

# Semester-II, Paper-V : Paleontology

| Sr. No. | Syllabus | Total | Marks |
|---|---|---|---|
| 1. | a. Palaeontology: Defintion, braches, importance and scope | 02 | **10** |
| 2. | Fossils: Definition, conditions and modes of preservation, uses of tonsils Index tossils | 06 | |
| 3. | Systematic position, morphology of hard parts, geological and geographical distribution of the following:<br>a. **Phylum Mollusca:**<br>I. Class: Lamellibranchia or Bivalvia: Morphology of hard parts of the shell and ornamentation and type of hinge lines and detitions.<br>II. Class: Gastorpoda: Morphology of hard parts of the shell and forms of the gastropod shell<br>III. Clas Cephalopoda: Morphology of hard parts of Nautiloids, Ammonoids, Belemnites and type of suture lines.<br>b. **Phylum Brachiopoda:** Morphology of hard parts of class articulate and inarticulate. Types of brachial skeleton<br>c. **Phylum Echinodermata:** Class Echinodea, morphology of hard parts of regularia and irregularia. Variation in the apical disc in echinoids.<br>d. **Phylum Arthropoda:** Class Trilobita-Morphology of hard parts of trilobites, types of facial sutures, conditions of phgidium.<br>e. **Phylum coelenterate: Class anthozoa madreporaria, polyp, medusa, types of septa** | <br><br><br>03<br><br>03<br><br>03<br><br>03<br><br>03 | **15** |
| 4. | **Statigraphy**<br>a. Principales of statigraphy<br>b. Physiographical division of India<br>c. Std. Geological timeslak<br>d. IIndian statigraphical timescale<br>e. Statigraphy code & Nomenilature | 2<br>4<br>4<br>4<br>8 | **25** |
| | **Total Number of Lectures** | 45 | **50** |

# Semester-II

## Practical Paper-VI
## [ based on Paper-IV & V ]

| Sr. No. | Syllabus | Total | Marks |
|---|---|---|---|
| 1. | Petrology<br>Megascopic study of the following rocks<br>a. Igneous: Granite, gabbro, rhyolite, basalt (its varieties Classification based on colour index, mineral composition and texture)<br>b. Secondary: Laterite, bauxite, breccia, condglomerate, sandstones, shales, mudstone and limestones.<br>c. Metamorphic: Slate, marble, quartzite, mica schist and hornblende schist, mica gness and hornblende gneiss. | 08 | 20 |
| 2. | **Patacontology**<br>Study of at least two specimens from each phylum/class (Total number of specimens should not be less than 15)<br>a. Phylum Mollusca-Class Lamellibranchia, Class Gastropoda, Class Cephalopoda.<br>b. Phylum Brachiopoda<br>c. Phylum Echinodermata<br>d. Phylum Arthropoda<br>e. Phylum coelenterate | 07 | 15 |
| 3. | **Depiction of important stratigraphic units in the map of India**<br>Geological Fieldwork to be conducted in an area of geological interest for at least two days and geological report to be submitted for the same. | 07 | 15 |
| | **Total** | **22** | **50** |

**Reference Books:**


1. Rutleys's Elements of Mineralogy: H.H. Read.
2. Text Books of Mineralogy: Dona and Ford
3. Rock Forming Minerals: Deer, Howie, Zussman
4. Manual of Mineralogy: Cornelius, S. Hurlbut and cornel Klein
5. Principals of Mineralogy: W.H. Blackburn, W.H. Denman
6. Mineralogy: Berry Mason, Dietrich
7. Principles of Petrology: Tyrrel
8. Invertebrate Plaeontology: Henry Woods
9. General Geology: Radhakrishan
10. Holmes' Principles of Physical Geology: Edited by P. Mcl. D. Duff.

**FACULTY OF SCIENCE**

B.Sc. (First Semester) Examination

**GEOLOGY**

Paper-I

(Mineralogy and crystallography)

Time-2 Hours Maximum Marks-50

"Please check whether you have to the right question Paper".

N.B. :- (i) Question no. 1 is Compulsory.

(ii) Solve any two questions from 2,3 & 4 and two questions from 5,6 & 7.

(iii) Use only blue or black pen.

(iv) All questions carry equal marks.

| | | |
|---|---|---|
| 1. | Multiple choice question (All Syllabus) | 10 |
| 2. | Descriptive (Mineralogy) | 10 |
| 3. | Descriptive (Mineralogy) | 10 |
| 4. | Short Notes (Mineralogy) | 10 |
| 5. | Descriptive (Crystallography) | 10 |
| 6. | Descriptive (Crystallography) | 10 |
| 7. | Short Notes (Crystallography) | 10 |

FACULTY OF SCIENCE

B.Sc. (First Semester) Examination

GEOLOGY

Paper-II

(General Geology and Structural Geology)

Time-2 Hours Maximum Marks-50

"Please check whether you have to the right question Paper".

N.B. :- (i) Question no. 1 is Compulsory.

(ii) Solve any two questions from 2,3 & 4 and two questions from 5,6 & 7.

(iii) Use only blue or black pen.

(iv) All questions carry equal marks.

| | | |
|---|---|---|
| 1. | Multiple choice question (All Syllabus) | 10 |
| 2. | Descriptive (General Geology) | 10 |
| 3. | Descriptive (General Geology) | 10 |
| 4. | Short Notes (General Geology) | 10 |
| 5. | Descriptive (Structural Geology) | 10 |
| 6. | Descriptive (Structural Geology) | 10 |
| 7. | Short Notes (Structural Geology) | 10 |

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