<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Qualification</th>
<th>Specialization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. S.C. Mathur</td>
<td><strong>Professor &amp; Head</strong></td>
<td>M.Sc.,Ph.D.</td>
<td>Sedimentology, Paleontology</td>
</tr>
<tr>
<td>Dr. K.L. Shirvastva</td>
<td><strong>Professor</strong></td>
<td>M.Tech.,Ph.D.</td>
<td>Economic Geology, Mineral Exploration</td>
</tr>
<tr>
<td>Dr. M.S. Sisodia</td>
<td><strong>Professor</strong></td>
<td>M.Sc.Tech.,Ph.D.</td>
<td>Planetary Science, Sedimentology</td>
</tr>
<tr>
<td>Dr. S.K. Trivedi</td>
<td><strong>Associate Professor</strong></td>
<td>M.Sc.,Ph.D.</td>
<td>Sedimentology, Mineral Exploration</td>
</tr>
<tr>
<td>Dr. (Mrs.) B. Tripathi</td>
<td><strong>Associate Professor</strong></td>
<td>M.Sc.,Ph.D.</td>
<td>Structural Geology, Metamorphic Petrology</td>
</tr>
<tr>
<td>Dr. S.R. Jakhar</td>
<td><strong>Associate Professor</strong></td>
<td>M.Sc.,Ph.D.</td>
<td>Paleontology</td>
</tr>
<tr>
<td>Dr. V.S. Parihar</td>
<td><strong>Assistant Professor</strong></td>
<td>M.Sc.,Ph.D.</td>
<td>Sedimentology, Paleontology</td>
</tr>
</tbody>
</table>
B. Sc. I year  Geology  2015

Theory

Paper I  Physical Geology  50 Marks
Paper II  Mineralogy   50 Marks
Paper III  Palaeobiology  50 Marks
Practicals  :  Practical Examination  75 Marks

Total  225 Marks

Duration of each theory paper Examination  3 Hrs.
Duration of Practical Examination  3 Hrs.

PAPER I  :  PHYSICAL GEOLOGY

Unit I

Unit II
Elementary ideas of continental drift, Sea floor spreading and the theory of plate tectonics. Types of plates. Causes and rate of plate movement. Application of theory of plate tectonics in Geology to explain origin of mineral deposits Mountains, Earthquake belts, Island arcs and various Petrogenesis.

Unit III
Rock Weathering and Erosion. Difference between Weathering and Erosion. Types of weathering, Soil formation, soil profile and soil types.
Geological work of rivers, glaciers, wind and groundwater.

Unit IV
Volcanoes: Types, Products and distribution.

Unit V
Oceanography: Geological work of Ocean; Physical features of Oceans, Coasts, Deep Sea trench, Midoceanic Ridges and Abyssal plain. Generation of oceanic currents, surface currents and global ocean Conveyor system; wave erosion and beach processes; ocean as a thermostat for the earth's surface heat balance.

Climatology: Atmospheric circulation, weather and climate changes. Land-air-sea interaction, Earth's heat budget and global climatic changes. Glacial, interglacial periods and ice ages.

PAPER II: MINERALOGY

Unit I
Fundamental laws of crystallography, elements of crystal symmetry, Millers, Weiss and Millarian system of notation and parameters. Crystal forms and their classification into crystal system, Introduction to space lattice.

Study of the normal classes of following crystal systems – Cubic system, Tetragonal system, Hexagonal system, Trigonal system, Orthorhombic system, monoclinic system, Triclinic system. Introduction to Symmetry classes (32). Twinning.

Unit II
Physical properties of minerals. Concept of Isomorphism, Polymorphism, Solid solution, Exsolution. Elementary idea about structure and classification of silicate minerals. Physical properties of the following minerals.

Unit III
Petrological microscope and its construction; principles of optics as applied to orthoscopic and conoscopic study of minerals: color, form, birefringence, pleochroism, uniaxial and biaxial characters of minerals. Study of optical properties of Muscovite, Biotite, Quartz, Orthoclase, Microcline, Plagioclase, Olivine, Augite and Hornblende.

Unit IV
Mineralogical study of the following families.
(i) Olivine (ii) Pyroxene (iii) Amphibole

Unit V
Mineralogical study of the following families.
(i) Quartz (ii) Feldspar (iii) Mica (iv) Garnet
PAPER III: PALAEOBIOLOGY

Unit I

Unit II

Unit III

Unit IV

Unit V
Elementary knowledge of Gondwana flora and vertebrates of Siwaliks. Evolutionary history of Man, Horse and Elephant. Introduction to Glosopteris, Gangmopteris, Vertibraria and Ptilophyllum.

PRACTICALS
(1) Identification and Description of fossils in hand specimens.
(2) Identification and Physical Properties of Minerals in hand specimens.
(3) Identification and Description of Minerals under Petrological microscope
(4) Physical Geology Experiments.
(5) Sessional Marks.

SUGGESTED READING
1. Dutta A. K. ‘Physical Geology.’
3. Aurther Homes. ‘Principles of Physical Geology’
4. Savinder Singh ‘Bhu Akrati Vigyan’

B. Sc. II year  Geology  2015

Theory
Paper I  Igneous and Metamorphic Petrology  50 Marks
Paper II  Sedimentary Petrology  50 Marks
Paper III  Stratigraphy  50 Marks
Practicals  :  Practical Examination  75 Marks

Total  225 Marks

Duration of each theory paper Examination  3 Hrs.
Duration of Practical Examination  3 Hrs.

PAPER I : IGNEOUS AND METAMORPHIC PETROLOGY

Unit I :
Composition of magma. Crystallization of Unicomponent(Silica), Bicomponent(Ab-An) and Tricomponent magma(Ab-An-Di). Bowen’s Reaction Series. Forms and Structures of Igneous rocks

Unit II :
Textures and their genetic implications for Igneous rocks. Elementary idea of classification of Igneous rocks based on Mineralogical, mode of occurrence and Geochemical factors. Tabular classification of Igneous rocks.

Unit III :
Metamorphism and its kinds and agents. Concept of depth zones, facies and grades of metamorphism. Texture and structures of metamorphic rocks.
Unit VI:
Regional metamorphism of argillaceous, arenaceous and mafic rocks. Thermal metamorphism of impure carbonate rocks. Cataclastic metamorphism.

Unit V:
Field, megascopic and microscopic characteristics and petrogenesis of following rocks. (A) Granite, Syenite, Gabbro, Anorthosite, Peridotite, Pegmatite, Lamprophyre, Rhyolite, Basalt. (B) Quartzite, Marble, Phyllite, Schist, Slate, Gneiss, Migmatite, Granulite and Charnokite.

PAPER II: SEDIMENTARY PETROLOGY

Unit I:
Sediments and Sedimentary rocks, the process of their formation;
Sedimentary structure: Surface structure- ripple marks, sole marks, rill marks, rain prints.
Internal structure: bedding, gradded bedding, cross bedding and penecontemporaneous deformation. Biogenic structures: stromatolites and ichnofossils.

Unit II:
Texture of sedimentary rocks; grain size their distribution and geological significance, shape sphericity and roundness, packing orientation and internal fabric of sedimentary rock.
Heavy minerals: The process of separation and study for provenance determination.

Unit III:
Types of sediments and sedimentary rocks- clastic rocks, their classification and characteristics, Petrogenesis of common clastic rocks. Characteristics of Sandstone, Siltstone, Shale, Conglomerate and Breccia.

Unit IV:
Chemical and Biogenic Rocks: Characteristics, classification and origin. Characteristics of Limestone, Dolomite, Phosphorite, Lignite and Coal.

Unit V:
Elementary knowledge of sedimentary environments. Characteristics of their products: Glacial, Lacustrine, Fluvial, Deltaic Shore line, Shelf and deep marine environments.

PAPER III: STRATIGRAPHY

Unit I:
Unit II:
Archean Geology of Dharwar Craton, Singhbhum Craton, Baster Craton and Eastern Ghat Craton and Rajasthan Craton (Bhilwara Supergroup to include BGC and Pre Aravalli metasediments).

Unit III:

Unit IV:

Unit V

PRACTICALS
1. Petrological characteristics (Mineralogy, texture and structural and Petrogenesis) of important Igneous, Metamorphic and Sedimentary rocks in handspecimens.
2. Petrological characterstics (Mineralogy, texture and structural and Petrogenesis) of important Igneous, Metamorphic and Sedimentary rocks under Petrological Microscope.
3. Identification and Stratigraphic Ordering of rocks samples.
4. Demarcation of important Supergroups of Indian Stratigraphy in outline map of India.
5. Preparation of Geological map of western Rajasthan in Lab.

SUGGESTED READING
1. Tyrell GW Principles of Petrology
2. Tyrell GW Sailiki ke Sidhant, Madhya Pradesh Hindi Granth Academy, Bhopal.
6. Ravindra Kumar Fundamentals of Historical geology and Stratigraphy of India. Willey Eastern New Delhi
7. Wadia D N Geology of India
B. Sc. III year Geology 2015

Theory

<table>
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<tr>
<th>Paper</th>
<th>Subject</th>
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<tr>
<td>Paper I</td>
<td>Economic Geology</td>
<td>50</td>
</tr>
<tr>
<td>Paper II</td>
<td>Structural Geology</td>
<td>50</td>
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<tr>
<td>Paper III</td>
<td>Applied Geology</td>
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<tr>
<td>Practicals</td>
<td>Practical Examination</td>
<td>75</td>
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<tr>
<td><strong>Total</strong></td>
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</tr>
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</table>

Duration of each theory paper Examination 3 Hrs.
Duration of Practical Examination 3 Hrs.

**PAPER I : ECONOMIC GEOLOGY**

**Unit I :**
Ore forming process and deposits : Magmatic Concentration, Pegmatite, Contact metasomatism (including Skarns), Hydrothermal process and deposits.

**Unit II :**
Ore forming process and deposits : Sedimentation (Chemical Precipitation and Evaporation), Weathering (Residual and Mechanical Concentration), Oxidation and Supergene sulphide enrichment. Volcanogenic, Metamorphic and Biogenic Process and deposits.

**Unit III :**
Geological setup and economic aspects of ( a ) Gold deposits of India (including Kolar Gold Field), ( b ) Lead Zinc and Copper deposits of India (including Zawar, Rajpura-Dariba, Malanjkhand, Khetri and Singhbhum deposits) ( c ) Iron and manganese deposits of India ( d ) Aluminium, Chromium, Tin and Tungsten deposits of India. Physical properties, mode of occurrence and genesis, Indian location and economic use of following Ore minerals : Native Gold, Galena, Sphalerite, Chalcopryte, Limonite (Gossan), Magnetite, Hematite, Pyrolusite, Psilomelane, Wed Ore, Bauxite, Chromite, Wolframite and Casseterite.

**Unit VI :**
Description of minerals used in the industries including, Cement, Fertilizer, Refractory, Abrasive, and Gem Stones.

Introduction of mineral used in industries including, Glass and Ceramics, Paint and Pegments, Insulator, Electronic and Building Stones.

Physical properties, mode of occurrence and genesis, economic use and Indian location of following industrial minerals and rocks: Apatite, Phosphorite, Pyrite, Gypsum, Diamond, Zircon, Kyanite, Magnesite, Garnet, Corundum, Quartz, Feldspar, Asbestos, Wollastonite, Talc, Fluorite, Barite, Muscovite, Ochur, Malachite, Azurite, Graphite. Limestone, Marble and Granite.

**Unit V :**


**PAPER II: STRUCTURAL GEOLOGY**

**Unit I :**


**Unit II :**


**Unit III :**


**Unit IV :**


**Unit V :**

PAPER III : APPLIED GEOLOGY

Unit I :

Unit II :

Unit III :
Engineering Geology :Types and terminology of Dams and Tunnels. Geological considerations to locate dams and tunnels including (a) structural geology (b) Lithology and (c) Groundwater. Geological disasters : Earthquakes and Tsunami, Volcano, Flood and Landslide.

Unit VI :

Unit V :

PRACTICALS
1. Physical properties, mode of occurrence and genesis, Indian location and economic use of Metallic minerals (ores).
2. Physical properties, mode of occurrence and genesis, Indian location and economic use of Non Metallic (industrial Minerals) and Coals.
3. Preparation of map showing distribution of important economic deposits.
4. Preparation of Cross section of Geological maps and/or completion of outcrop maps.
5. Use of Stereographic projections for Structural geology.
SUGGESTED READING

2. Gokhle KVand GK Rao  ‘Ore Deposits of India,. Thomson Press
6. Billings M. P.  ‘Structural Geology’
7. Shrivastava D.K.  Sanrachnatmak Bhu Vigyan Madhya Pradesh Hindi Granth Academy
8. Arogyaswami RNP  ‘Mining Geology’ CBS publishers
9. Todd  ‘Groundwater Hydrology’