SHIVAJI UNIVERSITY, KOLHAPUR.

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Accredited By NAAC with 'A' Grade

CHOICE BASED CREDIT SYSTEM

Syllabus For

B.Sc. Part - I

Geology

SEMESTER I AND II

(Syllabus to be implemented from June, 2018 onwards.)

B. Sc. Part – I

SUBJECT: GEOLOGY

Semester – I (Duration: 06 Months - 24 Weeks)

DSE – A Theory Course

Teaching: 60 hrs. (75 lectures of 48 minutes)

Title of the Paper: PHYSICAL AND STRUCTURAL GEOLOGY

DSE 21A: PHYSICAL GEOLOGY Marks 50 (Credits:2)

Unit I: (15 Hours) (18-19 Lectures)

Introduction to Geology and its scope, Earth and Solar system: origin, size, shape, mass, density and its atmosphere (3 Hours approx.)

Origin of Earth: Laplace and Kant Nebular Hypothesis; Buffon, Chamberlain and Moulton Planetesimal Theory, Jean and Jeffery's Tidal Theory (3 Hours approx.)

Age of Earth: Physical, Chemical, Biological and Radioactive methods (4 Hours approx.)

Interior of the Earth: Use of seismic waves in understanding the internal structure of the Earth- Inner Core, Transition zone, Outer Core, Mantle, Asthenosphere, Mesosphere, Lithosphere- Sial and Sima(Crust) and main Discontinuities (5 Hours approx.)

Unit II: 15 Hours (18-19 Lectures)

Weathering: Definition, Types, Agents and controlling factors (3 Hours approx.)

Earthquake: Seismology- Definition, Focus, Epicenter, Seismic waves, Isoseismal lines Measurement of earthquakes –Seismographs and Seismograms, Intensity and Magnitude, Earthquake scales: Mercalli Scale and Richter Scale

Causes of Earthquake – Natural and Manmade (7 Hours approx.)

Volcano: Types, Products and Causes of Volcanism (5 Hours approx.)

DSE 22A: STRUCTURAL GEOLOGY Marks 50 (Credits:2)

Unit I: (15 Hours) (18-19 Lectures)

Introduction to Structural Geology, Elementary idea of Bed, Dip and Strike, contours, Outcrops, effects of various structures on outcrop; (4 Hours approx.)

Topographic and Geological maps; (4 Hours approx.)

Clinometer, Brunton Compass and their use; (2 Hours approx.)

Folds: Parts of Folds,Types of Folds (5 Hours approx.)

Unit II: (15 Hours) (18-19 Lectures)

Faults: Parts of Fault; Geometric and Genetic Classification of Faults (5 Hours approx.)

Joints: Definition; Types of Joints; Significance of Joints (5 Hours approx.)

Unconformity: Definition, Types of Unconformities; Significance of Unconformities (5 Hours approx.)

DSE – A LAB COURSE:

Teaching: 15 Practical turns - each of 3.2 hours (4 Lectures of 48 Minutes)

Marks - 50 (**Credits: 02)**

PHYSICAL AND STRUCTURAL GEOLOGY

Marks - 50 (Credits: 02)

Section I

Physical Geology: (15 Practical classes of 2 hours duration totaling to 30 hours or equivalent)

1. Study of important and common geomorphological models
2. Reading of Toposheets
3. Identification of geomorphological features – natural and manmade

Section II

Structural Geology: (15 Practical classes of 2 hours duration totaling to 30 hours or equivalent)

1. Study of Clinometer / Brunton Compass
2. Identification of folds from block models
3. Identification of faults from block models
4. Preparation of cross-section profile from geological maps – Horizontal/Inclined beds.

Recommended Books

1. Arthur Holmes, 1992. Principles of Physical Geology. Chapman and Hall, London.
2. Miller, 1949. An Introduction to Physical Geology. East West Press Ltd.
3. Spencer, E.V., 1962. Basic concepts of Physical Geology. Oxford & IBH.
4. Mahapatra, G.B., 1994. A text book of Physical geology. CBS Publishers.
5. Billings, M.P., 1972. Structural Geology. Prentice Hall.
6. Davis, G.R., 1984. Structural Geology of Rocks and Region. John Wiley
7. Hills, E.S., 1963. Elements of Structural Geology. Farrold and Sons, London.
8. Singh, R. P., 1995. Structural Geology, A Practical Approach. Ganga Kaveri Publ., Varanasi

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B. Sc. Part – I

SUBJECT: GEOLOGY

Semester – II (Duration: 06 Months - 24 Weeks)

DSE – B Theory Course

Teaching: 60 hrs. (75 lectures of 48 minutes)

Title of the Paper: CRYSTALLOGRAPHY AND MINERALOGY

DSE 21B: CRYSTALLOGRAPHY Marks-50 (Credits: 02)

Unit I: (15 Hours)

Definition of crystal, Crystal Elements: Faces, Edges, Solid angles, Forms (open and closed), Zones. (3 Hours)

Interfacial angle: Law of constancy of Interfacial angle, Contact Goniometer. (2 Hours)

Crystallographic axes and angles. (3 Hours)

Parameters and Indices, Law of Rational Indices. (3 Hours)

- Classification of crystal systems 6/7 systems and 32 classes – (2 Hours)
- Elements of Symmetry (2 Hours)

Unit II: (15 Hours)

Description of Normal class of – Isometric, Tetragonal, Hexagonal,
Orthorhombic, Monoclinic and Triclinic system (9 Hours)

Chemical Bonding in minerals (3Hours)

Definition of Mineral, Characteristics of minerals belonging to each crystal system. (3 Hours)

DSE 22B: MINERALOGY Marks-50 (Credits: 02)

Unit I: (15 Hours)

Description Physical Properties of minerals - Form, Colour, Transparency, Streak, Lustre, Cleavage, Fracture, Hardness and Specific Gravity (5 Hours)

Study of following minerals (Chemical composition, Crystal system, and Physical properties): Quartz, Orthoclase, Microcline, Hypersthene, Hornblende, Garnet, Muscovite, Biotite, Chlorite, Olivine, Epidote, Calcite. (10 Hours)

Unit II: (15 Hours)

Ordinary and Polarized Light – (1 Hour)

Polarizing Microscope – Parts and functioning – (3 Hours)

Optical properties of minerals in Plane Polarized Light –Colour, Pleochroism, Form, Relief, Cleavage, Fracture etc – (3 Hours)

Optical properties between crossed nicols –Isotropism / anisotropism, Extinction, Extinction angle, Interference Colours / Polarization colours – (3 Hours)
Study of optical properties of common rock forming minerals – Quartz, Orthoclase, Microcline, Olivine, Augite, Hornblende, Muscovite, Biotite, Garnet, Calcite – (5 Hours)

DSE – B LAB COURSE

Teaching: 15 Practical turns - each of 3.2 hours (4 Lectures of 48 Minutes)

Marks - 50 (**Credits: 02)**

CRYSTALLOGRAPHY AND MINERALOGY

Marks - 50 (Credits: 02)

Section I

- **Crystallography:** (15 Practical classes of 2 hours duration totaling to 30 hours or equivalent)
  Study of Normal class of Isometric, Tetragonal, Hexagonal, Orthorhombic, Monoclinic and Triclinic systems covering crystallographic axes, elements of symmetry, type mineral, holding position and forms with faces and indices.

Section II

- **Mineralogy:** (15 Practical classes of 2 hours duration totaling to 30 hours or equivalent)

  1. Study of physical properties of minerals - Quartz, Orthoclase, Microcline, Hypersthene, Hornblende, Garnet, Muscovite, Biotite, Chlorite, Olivine, Epidote, Calcite

  2. Use of Polarizing Microscope

  3. Study of Optical properties of common rock forming minerals – Quartz, Orthoclase, Microcline, Olivine, Augite, Hornblende, Muscovite, Biotite, Garnet, Calcite

Geological Field Training

Geological Field Training is compulsory for students to undergo field training in a suitable geological area and submit a report thereof.

Recommended Books

1. Dana, E.S. and Ford, W.E., 2002. A textbook of Mineralogy (Reprints).
2. Flint, Y., 1975. Essential of crystallography, Mir Publishers.
3. Phillips, F.C., 1963. An introduction to crystallography. Wiley, New York.
4. Berry, L.G., Mason, B. and Dietrich, R.V., 1982. Mineralogy. CBS Publ.
5. Nesse, D.W., 1986. Optical Mineralogy. McGraw Hill.

6. Read, H.H., 1968. Rutley's Element of Mineralogy (Rev. Ed.). Thomas Murby and Co.
7. Berry and Mason, 1961. Mineralogy. W.H. Freeman & Co.
8. Kerr, B.F., 1995. Optical Mineralogy 5th Ed. Mc Graw Hill, New York.

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EXAMINATION SCHEME

Theory: Theory examination will be conducted at the end of each semester.

Paper: Duration: 2 Hrs. Marks: 50. Minimum for passing: 35%.

Practical: Practical Examination will be conducted annually towards the end of Second Term of every Academic year.

Duration: 1 Day (6 Hours approx.). Marks: 50. Minimum for passing: 35%.

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