Solapur University, Solapur

Semester Pattern Syllabus of B. Sc. (Part-I) Geology (w. e. f. June 2010)

SEMESTER-I

Paper -I: Introduction to General Geology.

(50 Marks)

Introduction to General Geology

(Total Periods 35)

- Introduction: Meaning, scope, interdisciplinary nature and significance of geology. Brief outline of - (1) Universe- origin: Galaxies and. Nebulae (2) Solar system characteristics, members, constitution and mechanism of the system, Planetary laws (5 Periods)
- 2. <u>Origin of the Earth</u>: Brief account on Nebular and Planetesimal hypothesis. Modern theories of origin of the earth. Physical data of the Earth- shape, size, mass, density, rotation, revolution, Galactic movements; Solstices, Equinox,

(6 periods)

- **3.** <u>Divisions and Geomorphic features of the Earth</u>: A brief introduction to principal divisions of the earth; Atmosphere, hydrosphere and biosphere. Distribution and description of 1st, 2nd and 3rd order relief features and Hypsographic curve. (5 Periods)
- 4. <u>Earthquakes</u>: Definition and effects of Earthquake, Causes of Earthquake natural and man made, Seismology: Focus, Epicenter, Seismic waves, isoseismal lines. Measurement of Earthquake- seismographs and Seismograms, intensity and Magnitude earthquake Scales: Richter scale. Locating the epicenter and depth of the Focus, Classification of Earthquakes, Distribution of earthquake centers (i.e. Earthquake Belts; predictions and precautions of earthquakes, Major Seismic centers and zones of India. (7 Periods)
- **5.** <u>Interior of the Earth</u>: Internal structure of the Earth and discontinuities. Important zones. Importance and use of seismic waves in understanding the internal structure of the Earth, inner Core, Outer Core, Mantle, Asthenosphere, Mesosphere. Lithosphere- Sial and Sima (crust).

(6Periods)

6. <u>Volcano</u>: Definition and structure of volcano, types of Volcanoes, their characteristics. Causes of volcano. Products of volcano. Classification based on modes of eruption (Fissure and central). Associated features like fumaroles, solfatras, hot springs and geysers. Volcanic belt. (6 Periods)

Reference Book:-1) Principles of Physical Geology2) General Geology

A Holmes V Radhakrishna

Paper – II: Mineralogy and Paleontology

1. Mineralogy:

Definition of mineral, Chemical Bonding, Compound Formation, Physical properties of minerals, chemical composition of minerals. Study of following mineral groups with reference to general chemical and physical properties and occurrence in rocks.

- **l.** Olivine Group,
- 2. Pyroxene group: Augite, Hypersthene, Diopside,
- 3. Amphibole group: Hornblende, Actinolite, Trimolite, and Asbestos.
- 4. Mica Group: Muscovite, Biotite, Phlogopite, Lepidolite,
- 5. Feldspar Group
- 6. Silica Group.

(17 Periods)

2. <u>Paleontology: -</u>

Definition of Fossil, Conditions of fossilization, Modes of preservation, Uses of fossils. Study of morphology of hard parts of the fossil, classification & geological distribution of following phylum and class.

1.	Phylum Mollusca:		
	Class Lamellibranchia –	Gryphea, Cardita, Cardium, Pecte	n.
	Class Gastropoda –	Voluta, Conus, Turritella, Turbo, Physa.	
	Class Cephalopoda –	Nautilus, Goniatites	-
2.	Phylum Brachiopoda –	Productus, Spirifer, Terebratula	
3.	Phylum Echinodermata –	Echinus, Micraster, Hemiaster	
4.	Phylum Arthropoda –	Trilobites: Paradoxide, Trinucleus, Ogygia	
5.	Phylum Coelentera –		
	Class Anthozoa –		
	Order Zoanthoria –	Calceola, Montlivaltia	
	Order Alcyonaria –	Tubipora, Favosite	(18 Periods)
Refer	ence Book -		
1 Invo	rtibrata palacantalogy		U Wood

1. Invertibrate palaeontology	—	H. Wood
2. Rutley's elements of Mineralogy	_	H. H. Read

SEMESTER-II

Paper-III: Introduction to Physical Geology

Section-I- Introduction to Physical Geology

(50 Marks) (Total Periods 35)

 Weathering: Exogenic and endogenic forces acting on the earth, Definition of weathering, Types, Agents, and factors controlling weathering. Weathering processes - mechanical weathering, chemical weathering and biophysical weathering. Rate of Weathering, Differential Weathering. Products of weathering – Tors, Cliffs, Talus, Scree, Regolith, *Murrum*, Soil - formation & profiles.

(9 periods)

- 2. <u>Geological work of a Stream</u>: Main and tributary stream. Types of flows. Stream Processes of erosion, transportation and deposition. Play fairs concepts of Valley Development. Headword, Downward and Lateral Erosion by a stream. Erosional Features- River piracy, waterfalls, rapids, cascades, potholes, river terraces, meanders and ox-bow lake, graded profile and base level. Transportation by river. Depositional features- point bar, natural levees alluvial fans and cones, delta. Concept of Watershed in brief. (9 Period)
- **3.** <u>Geological work of Ocean / Sea</u>: Movement of sea water waves, tides, currents, tsunamis. Generation of oceanic currents. Wave erosion and beach processes, erosional features wave cut terrace, sea notch, sea caves, blow holes cave and headland, stacks, sea arch, Transportation by sea. Depositional features developed by ocean- beaches and barriers wave-built terrace spits, bars and hooks (5 periods)
- 4. <u>Geological work of glaciers</u>: Snow caps, snow lines. Definition & origin of glaciers. Types of glaciers, movement of glaciers, Surface features of glaciers, Glacier erosion, Erosional features of glaciers like- striations, grooves, and polished surfaces, U-shaped valley, hanging valley, cirque, fijords. Glacial and glacio-fluvial deposition. Depositional features like- boulder, clays, erratics, moraines, drumlins, eskers, kems & Kettle holes, outwash plains, and varves.

(5 Periods)

5. <u>Geological work of wind</u>: Definition, Origin of wind, Erosion by wind- Deflation, abrasion and attrition, hollows, deflation armors, deflation pavements, ventifacts, yardangs, pedestal rocks, balance stone, mushroom rock, striated and grooved rocks, Earth pillars, Transportation by wind. Causes of wind deposition. Depositional features like- Sand dunes, their types and loess. Deserts, kinds of deserts. Playas, Bajadas and pediments.

(7Periods)

Recommended Books:-

l Principles of Physical Geology	A Holmes
2 General Geology	V Radhakrishna

Paper – IV: Igneous, sedimentary and Metamorphic Petrology (equal weitage). (50 Marks) (Total periods -35).

- 1. <u>Petrology</u>: Introduction of petrology, Definition of rocks, Major subdivisions of petrology, The Rock Cycle (2 Periods)
- Igneous Petrology: Definition, composition and origin of magma, lava and igneous rocks; Concept of Primary Magma; Pyrogenetic Minerals, Primary, Essential and Accessory minerals, and Secondary Minerals; Intrusive and Extrusive Forms of Igneous Rocks: Concordant and Discordant Intrusions; Sills, Dykes, Ring Dykes, Cone Sheets, Composite and Multiple intrusions, Laccoliths, Lopoliths, Phacoliths, Batholiths, Stocks, Boss, Roof Pendent, and Volcanic plug. Megascopic Structures:- Vesicular, Amygdaloidal, Ropy, Block, Flow, Pillow and Columnar structures, Granitic, Porphyritic, Graphic and Glassy. (11 Periods).
- **3.** <u>Sedimentary Petrology</u>: Formation of Secondary rocks. Deposition, Consolidation. and Cementation of sediments; Sedimentary Processes; Classification of secondary rocks Source of material for Secondary rocks; Sedimentary Textures and mega-structures - Bedding, Current Bedding Graded bedding, Stratification, Lamination, Ripple Marks, Rain prints, Mud cracks (Sun cracks) Concretionary, Nodular, Stalactitic, Oolitic, Pisolitic Structure. (11 periods)
- Metamorphic Petrology: Definition Agents and Types of Metamorphism: Cataclastic, Dynamo thermal, Thermal, and Plutonic Metamorphism. Depth Zones; Megascopic structures in Metamorphic rocks - Slaty, Maculose, Flaser Granulose, Schistose, Gneissose, Augen and banded Structures. Stress and Antistress Minerals. (11 periods)

Recommended Books: -

1. Principles of Petrology

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G. W. Tyrrell

Semester Pattern Syllabus of a Practical Course in B.Sc. Part - I (Geology)

There are in all 24 practicals, 1 Practical is of 4 periods. The practical course will depend on the theory papers, practical experiments and field training. The practical course is subdivided into five units as follows. Each unit carries 10 marks. Thus the practical course is of 50 marks.

Unit-I: General Geology and Physical Geology.

- 1. Study of important and common geomorphologic models. Minimum five models.
- **2. Reading of toposheets:** Introduction of toposheets, Definition and function of Contours, Contour Interval, Map symbols and Scales.
 - ✓ <u>Identification of natural physical Features</u>: Hill, Hill Range, Mountains, Peaks, Cliffs, Divides, Bench Marks, Streams and stream patterns Catchment Areas of streams, Basins, lakes, slopes, Flood Plains, Islands in River Courses, Rocky and Sandy Beaches, Deltas and Distributaries, Sand dunes, Deserts, marshy lands, Marine transgression areas.
 - ✓ <u>Identification of Man-made features:</u> Settlements, Roads, Railways, Canals, Transmission lines Dams and Reservoirs, Tanks, Aerodromes, Post offices Temples Mosques and Church etc.
- **3. Drainage Analysis**: Stream ordering (Strahler's method), stream number, stream Lengths, Bifurcation Ratio, Basin Area, Drainage Density Drainage frequency and Drainage Pattern.

Unit-II: Mineralogy (Megascopic)

(10 marks)

(10 Marks)

- 1. <u>The Study of Physical Properties of Minerals</u>: Colour, Streak. Lustre Form, Fracture, Hardness. Cleavage, Determination of specific gravity by Walkers' steelyard.
- 2. <u>The study of Individual Minerals</u>:-Quartz, Rock crystal, Amethyst, Flint Agate, jasper, Chalcedony Opal, Natrolite, Stilbite Apophyllite Muscovite, Biotite, Phlogopite, Orthoclase, Microcline, Plagioclase, Hornblende, Actinolite, Tremolite, Asbestos, Augite, Hypersthene, Diopside, Olivine, Beryl, Barytes, Tourmaline, Fluorite, Corundum, Calcite, Garnet, Talc, kyanite

Unit III: Palaeontology

(10 marks)

Identification, classification and description of hard part morphology of following fossil specimens:

1.	Phylum Mollusca:	
	Class Lamellibranchia –	Gryphaea, Cardita, Cardium, Pecten.
	Class Gastropoda –	Voluta, Conus, Turritella, Turbo, Physa.
	Class Cephalopoda –	Nautilus, Goniatites
2.	Phylum Brachiopoda –	Productus, Spirifer, Terebratula
3.	Phylum Echinodermata -	Echinus, Micraster, Hemiaster
4.	Phylum Arthropoda –	Trilobites: Paradoxide, Trinucleus, Ogygia
5.	Phylum Coelentera –	

Class Anthozoa –

Order Zoanthoria – Calceola, Montlivaltia Order Alcyonaria – Tubipora, Favosite

Unit-IV: Petrology

(10 marks)

(10 marks)

Identification, description and classification of hand specimen of following rocks on the basis of their megascopic texture, structure, mineral composition

- 1. <u>Igneous Rocks</u>: <u>Structures and Textures</u>: Vesicular, Amygdaloidal, Flow Ropy, Pillow, Granular and Columnar Structures; Granitic, Porphyritic, Graphic and Glassy textures; Igneous <u>Rocks</u>: Granite, Porphyritic Granite, Diorite, Dolerite, Gabbro, Dunite, Pegmatite, Pitchstone, Rhyolite, Obsidian, Trachyte and basalt
- 2. <u>Secondary Rocks</u>: <u>Structures</u>: Porous, Oolitic, Pisolitic, Lamination, Bedding, Graded Bedding, Current Bedding, Ripple Marks and Mud cracks; Texture: Clastic. <u>Rocks</u>: Laterite, Bauxite Breccia, Conglomerate, Grit, Sandstone and it's varieties Shale, Limestone and it's varieties
- **3.** <u>Metamorphic Rocks</u>: <u>Structures</u>: Slaty, Schistose, Granulose, Gneissose, Augen, Banded, <u>Rocks</u>: Slates Phyllites Mica-Garnet-Schist, Hornblende Schist, Granite Gneiss, Hornblende Gneiss, Quartzite and Marble

Unit-V: Fieldwork and Practical records:

1. <u>Fieldwork Report or Field trip report</u>: Study Tour to Geologically interesting and important places for about three days is compulsory to each student. Field trips to nearby quarries and mines are to be conducted to get acquainted with field conditions. Submission of written Field Report is compulsory (5 marks)

- **2.** A Journal (Laboratory record) is compulsory (5 marks)
- **3.** <u>Note</u>: To appear for the practical examination a certified journal and a certified Field Work Report or Field Trip Report is **compulsory**. If the student does not present these certified documents, then the University appointed examiners will have the authority to **disallow the student to appear for the practical examination**.

Structure of the courses

Each paper of Geology for B.Sc. Part-I shall be of 50 Marks

There shall be Two papers (Paper I & Paper II) of 50 marks each for Semester-I

There shall be Two papers (Paper III & Paper IV) of 50 Marks each for Semester-II

Annual Practical examination at the end of year

Solapur University, Solapur Nature of Question Paper For Semester Pattern • Faculty of Science							
(w.e.f. June 2010)							
Time :- 2	Total Marks-50						
Q. No.1)	Multiple choice questions.	(10)					
	a) b) c) d) 2)						
	3) 4) 5)						
	6) 7)						
	8) 9) 10)						
Q.No.2)	Answer any Five of the following i) ii) iii) iv) v) vi)	(10)					
Q.No.3)	A) Answer any Two of the following i) ii) iii)	(06)					
	B) Write the Answer/Solve/Problem/Note	(04)					
Q.No.4)	Answer any Two of the following i) ii) iii)	(10)					
Q.No.5)	Answer any Two of the following i) ii) iii)	(10)					

1. Structure of the courses :-

- A) Each paper of every subject for Arts, Social Sciences & Commerce Faculty shall be of 50 marks as3 resolved by the respective faculties and Academic Council.
- B) For Science Faculty subjects each paper shall be of 50 marks and practical for every subject shall be of 50 Marks as resolved in the faculty and Academic Council.
- C) For B. Pharmacy also the paper shall be of 50 marks for University examination. Internal marks will be given in the form of grades.
- D) For courses which were in semester pattern will have their original distribution already of marks for each paper.
- E) For the faculties of Education, Law, Engineering the course structure shall be as per the resolutions of the respective faculties and Academic Council.

2. Nature of question paper:

A) Nature of questions.

"20% Marks - objectives question" (One mark each and multiple choice questions)

"40% Marks - Short notes / Short answer type questions / Short Mathematical type questions/ Problems. (2 to 5 Marks each)

"40% Marks - Descriptive type questions / Long Mathematical type questions / Problems. (6 to 10 Marks each)

- B) Objective type question will be of multiple choice (MCQ) with four alternatives. This answer book will be collected in first 15 minutes for 10 marks and in first 30 minutes for 20 marks. Each objective question will carry one mark **each**.
- C) Questions on any topic may be set in any type of question. All questions should be set in such a way that there should be permutation and combination of questions on all topics from the syllabus. As far as possible it should cover entire syllabus.
- D) There will be only five questions in the question paper. All questions will be compulsory. There will be internal option (30%) and not overall option. for questions 2 to 5.
- **3.** Practical Examination for B. Sc. I. will be conducted at the end of second semester.
- **4.** Examination fees for semester Examination will be decided in the Board of Examinations.

The structures of all courses in all Faculties were approved and placed before the Academic Council. After considered deliberations and discussion it was decided not to convene a meeting of the Academic Council for the same matter as there is no deviation from any decision taken by Faculties and Academic Council. Nature of Question Paper approved by Hon. Vice Chancellor on behalf of the Academic Council.