

Deccan Education Society's
FERGUSSON COLLEGE, PUNE
(AUTONOMOUS)

PROPOSED SYLLABUS UNDER AUTONOMY

SECOND YEAR B.Sc.
SEMESTER –III

PROPOSED SYLLABUS FOR S.Y.B.Sc. GEOLOGY

Academic Year 2017-2018

PAPER CODE: GLY2301 PAPER –I: MINERALOGY AND IGNEOUS PETROLOGY [Credit -3: No. of Lectures 45]		
	Title and Contents	No. of Lectures
Unit-I	<p>MINERALOGY</p> <p>A] Descriptive Mineralogy</p> <p>a) Mineral Kingdom: Crystalline and Non-Crystalline minerals.</p> <p>b) Study of the important rock forming minerals with respect to their Silicate Structure, Chemical Composition, Physical and Optical properties and Paragenesis.</p> <p>B] Optics</p> <p>a) Isotropism and Anisotropism in minerals</p> <p>b) Phenomenon of Extinction, Extinction Position in minerals of different Crystal System with respect to Vibration Direction and Optic Orientation.</p> <p>c) Phenomenon of Interference Colours and Newton’s Scale of Interference Colours.</p> <p>C] Gemology</p> <p>a) Introduction (Three basic attributes of Gemstones, Beauty, Durability and Rarity)</p> <p>b) Scope and Importance</p> <p>c) Study of the important gemstones with respect to their Physical Properties (Crystal System, Hardness and Sp. Gravity), Optical Properties (Colour, Luster, Singly Refracting / Doubly Refracting and Refractive Index) and Indian geographical occurrences</p>	<p>8</p> <p>4</p> <p>3</p>
Unit- II	<p>IGNEOUS PETROLOGY I</p> <p>A] Types Of Magma: Primary and derivative</p> <p>a) Reaction series and its importance</p> <p>b) Factors controlling grain size of igneous rocks</p> <p>B] Crystallization of Magma</p> <p>a) Unicomponent Magma</p> <p>b) Bicomponent Magma</p> <p style="padding-left: 20px;">i. Eutectic crystallization</p> <p style="padding-left: 20px;">ii. Solid solutions (Plagioclase series)</p> <p>c) Binary magma with an incongruent melting compounds: Leucite – silica system Ternary system: Albite-Anorthite-Diopside system</p>	<p>5</p> <p>10</p>

Unit- III	IGNEOUS PETROLOGY II	
	A] Textures and Microstructures a) Definition, factors determining the texture of rock b) Study of important textures and structures in plutonic, hypabyssal and volcanic rocks with respect to characters examples and genesis	7
	B] Description of rock types Description of important igneous rock types with regard to their characteristics, composition, origin and occurrence in relation to their tectonic setting:	6
	C] Deccan Volcanic Province Introduction, Geographical Distribution, formation and characteristics of DVP	2
Reference Books-		
1. Gribble, C. D., 1988, Rutley's Elements of Mineralogy, 27 th Edition, Unwin Hyman, London		
2. Berry, L. G., Dietrich, R. V., and Mason, B., 1985, Mineralogy, CBS Publishers & Distributors, India, 561p.		
3. Elher and Blatt, 1997, Petrology: Igneous, metamorphic and sedimentary, CBS publishers and distribution, New Delhi.		
4. Tyrrell, G. W., 1978, Principles of Petrology, Chapman and Hall Ltd.		

PAPER CODE:GLY2302		
PAPER –II: STRUCTURAL GEOLOGY		
[Credit -3: No. of Lectures 45]		
	Title and Contents	No. of Lectures
Unit -I	<p>INTRODUCTION TO STRUCTURAL GEOLOGY</p> <p>A] Introduction</p> <p>a) Definition and its relation with other branches of geology</p> <p>b) Tectonic and Non-tectonic structures.</p> <p>c) Scale of tectonic structures (Micro, Meso, Macro & Regional)</p> <p>B] Planar/Linear Structures</p> <p>a) Attitude of planar feature - Strike and Dip</p> <p>b) True & Apparent Dip, True & Apparent thickness, True & Apparent Width of Outcrop and Vertical Thickness of planar feature.</p> <p>c) Attitude of Linear Feature, Bearing, Plunge and Rake of Linear Feature in given Planar Feature.</p> <p>d) Outlier and Inlier- Definition & Formation.</p> <p>e) Brunton Compass & its uses.</p> <p>C] Determination of Top of Beds</p> <p>Determination of Top of Beds With The Help of Primary Structures (Sedimentary & Igneous)</p> <p>D) Interpretation of Major Structures with which they are associated.</p>	<p>4</p> <p>7</p> <p>2</p> <p>2</p>
Unit - II	<p>DEFORMATION STRUCTURES I</p> <p>A] Joints</p> <p>a) Definition and general characteristics of joints</p> <p>b) Rupturing under tension, compression, couple and torsion</p> <p>c) Geometric and genetic classification of joints with examples</p> <p>B] Faults</p> <p>Nomenclature, Classification and Recognition of faults.</p> <p>C] Shear Zones</p> <p>Nomenclature, Classification and Recognition of shear zones.</p>	<p>3</p> <p>10</p> <p>2</p>

Unit -III	DEFROMATION STRUCTURES II A] Folds Introduction, nomenclature, classification and recognition of folds. B] Landforms associated with tectonic structures	11 4
Reference Books 1. Billings M.P., 1972, Structural Geology, 3 rd Edition, Prentice Hall 2. Davis G.H.,2012, Structural Geology of rocks and regions, John Wiley & Sons		

	PAPER CODE:GLY2303 PAPER –III: PRACTICALS [Credit -2: No. of Practicals 10]
	Title of Experiment/ Practical
1	Identification of following Megascopic minerals in hand specimens with the help of physical properties
2	Study of Ore minerals and Study of Gemstones
3	Megascopic study and identification of the following igneous rocks.
4	Microscopic study and identification of following igneous rocks
5	Study of geological maps with a series of horizontal beds
6	Study of geological maps with a series of inclined beds
7	Structural Problems I- involving hill slope (hill slope given/ hill slope to be determined), true dip, true thickness, true width of outcrop and vertical thickness of the bed.
8	Structural Problems II- involving true and apparent Dip, true and apparent thickness, true and apparent width of outcrop and vertical thickness of the bed (True dip & true thickness/ Vertical thickness/ width of the outcrop given).
9	Structural Problems III- involving true and apparent dip of the bed- i) True dip of the bed given- To find out apparent dip amount in the given apparent dip direction ii) True dip of the bed given- To determine apparent dip direction for given apparent dip amount. iii) Two apparent dip amounts in two different directions given- To find out strike direction, true dip direction and true dip amount. Note- (Problems II and III to be solved by using descriptive geometry method involving construction of vertical section in desired directions)
10	Revision Practical

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SECOND YEAR B.Sc.
SEMESTER –IV

PROPOSED SYLLABUS FOR S.Y.B.Sc. GEOLOGY

Academic Year 2017-2018

PAPER CODE:GLY2401		
PAPER –I: SEDIMENTARY AND METAMORPHIC PETROLOGY		
[Credit -3: No. of Lectures 45]		
	Title and Contents	No. of Lectures
Unit - I	<p>SEDIMENTARY PETROLOGY- I</p> <p>A] Introduction</p> <p>a) Introduction to terms Sedimentology and Sedimentary Petrology</p> <p>b) Role of weathering in sedimentation:</p> <p> i. Physical weathering processes</p> <p> ii. Chemical weathering processes & mobility of oxides</p> <p> iii. Mineral stability series</p> <p>c) Derivation of sediments</p> <p>d) Concept of provenance</p> <p> i. Introduction</p> <p> ii. Based on petrography, light & heavy mineral suites</p> <p>e) Concept of matrix and cement and its effect on porosity and permeability</p> <p>B] Dispersal / Transportation of Detrital Sediments:</p> <p>a) Modes of Transportation</p> <p>b) Dynamics of transportation</p> <p>c) Definition of Competence, Capacity and Load of transporting Medium</p> <p>d) Concept of shape & size classification</p> <p>e) Grade scales (Udden, Wentworth, Krumbein & Phi scale)</p> <p>f) Progressive changes in sediments during transport with respect to size, shape and mineral composition.</p> <p>g) Concept of dispersal based on: size, roundness & sphericity, mineral</p> <p>h) Sorting and Maturity of Sediments</p> <p>i) Composition & processes (Selective abrasion, Selective</p>	<p>6</p> <p>9</p>

	sorting & progressive dilution)	
Unit -II	<p>SEDIMENTARY PETROLOGY- II AND METAMORPHIC PETROLOGY-I</p> <p>A] Sedimentary Petrology-Ii</p> <p>a) Diagenesis:- Outline of following diagenetic processes: Cementation, Authigenesis, Diagenetic Metasomatism, Diagenetic Differentiation and Intrastratal Solution.</p> <p>b) Classification of sandstones & limestones</p> <p>METAMORPHIC PETROLOGY-I</p> <p>A) Metamorphism and Metamorphic Minerals:</p> <p>a) Salient features of metamorphism as a process and types of metamorphism</p> <p>b)Difference between Metamorphism, Weathering, Diagenesis and Metasomatism</p> <p>c) Metamorphic minerals- Stress and anti-stress minerals, Idioblastic and Xenoblastic crystals.</p> <p>d) Common habits of metamorphic crystals.</p>	<p>5</p> <p>10</p>
Unit -III	<p>METAMORPHIC PETROLOGY- II</p> <p>A] Metamorphic Reconstitution</p> <p>B] Characteristics of Crystal Growth in the Solid State.</p> <p>C] Forces of Crystallization & the Concept of the Crystalloblastic Series</p> <p>D] Diagnostic Structures Of Thermally Metamorphosed Rocks, Cataclastically Metamorphosed Rocks, Regionally Metamorphosed Rocks & Their Development- Foliations, Schistosity, Gneissosity & Cleavage</p>	<p>2</p> <p>2</p> <p>2</p> <p>9</p>
Reference Books-		
<ol style="list-style-type: none"> 1. Elher and Blatt, 1997, Petrology: Igneous, metamorphic and sedimentary, CBS publishers and distribution, New Delhi. 2. Sengupta S.M., 2013, Introduction to Sedimentology, CBS publishers and distribution, New Delhi. 3. Pettijohn F.J., 2004, Sedimentary Rocks, 3rd Edition, CBS publishers and distribution, New Delhi. 4. Francis J. Turner, John Verhoogen,1960, Igneous and metamorphic petrology, McGraw-Hill 		

PAPER CODE:GLY2402

PAPER –II: PRINCIPLES OF STRATIGRAPHY AND INDIAN STRATIGRAPHY

[Credit -3: No. of Lectures 45]

	Title and Contents	No. of Lectures
Unit –I	PRINCIPLES OF STRATIGRAPHY- I	
	A] Introduction a) Definition b) Development of stratigraphic concepts c) Importance of Stratigraphy d) Various principles of Stratigraphy	4
	B] Stratigraphic Classification & Nomenclature a) Study of stratigraphic elements b) Lithostratigraphy c) Chronostratigraphy d) Biostratigraphy e) Inter-relationship between lithostratigraphic, chronostratigraphic and biostratigraphic units.	7
	C] Methods of Collecting Stratigraphic Data a) Outcrop b) Subsurface	4
Unit –II	PRINCIPLES OF STRATIGRAPHY II	
	A] Stratification a) Introduction to concept of basin b) Processes of stratification c) Controlling factors-physical, chemical and biological d) Vertical succession, alternations, varves, cycles	7
	B] Unconformity a) Definition b) Importance in stratigraphy c) Types d) Environmental classification e) Stratigraphic evidence of unconformities	5
	C] Stratigraphic Correlation Definition and evidence for correlation-physical and palaeontological	3

Unit- III	INDIAN STRATIGRAPHY A] Physiographic Divisions of India Peninsular India, Extra peninsular India and Indo-gangetic plane B] Study of following stratigraphic units of India with respect to their classification, lithology and geographic distribution i. Dharwar Supergroup ii. Cuddappah Supergroup iii. Gondwana Supergroup iv. Deccan Volcanic Province v. Tertiary and Quaternaries of Kachchh vi. Broad framework of Himalyan stratigraphy	 2 13
Reference Books- <ol style="list-style-type: none"> 1. Krumbein W.C., Sloss L.L.,1951 ,Stratigraphy and Sedimentation, John Wiley and sons. 2. Ravindra Kumar, 1985, Fundamentals of Historical Geology and Stratigraphy of India, New age international Publishers 		

	PAPER CODE:GLY2403 PAPER –III: PRACTICALS [Credit -2: No. of Practicals 10]
	Title of Experiment/ Practical
1	Megascopic study and identification of the following sedimentary rocks.
2	Microscopic study and identification of the following sedimentary rocks.
3	Megascopic study and identification of the following metamorphic rocks
4	Microscopic study and identification of the following metamorphic rocks.
5	Construction of litholog from the given data.
6	Construction of various biostratigraphic charts from the given data. Representing various stratigraphic units from boundary map of India.
7	Study of geological maps with a conformable series with one vertical dyke.
8	Study of geological maps with two conformable series.
9	Study of geological maps with a conformable series with one or two vertical faults.
10	Revision