GONDWANA UNIVERSITY, GADCHIROLI

Choice Based Credit System (CBCS)

Syllabus of

B. Sc. II (Geology)

(Semester III and IV)
(Three Years Degree Course)

2018-2019

Year	Semester	Paper		Paper title	Marks		Total marks	Credits	Total marks
					Theory	Internal			
B. Sc. Second Year	**I**	I	**Core Course**	USGEOT05: Igneous Petrology	50	10	60	2	150
		II		USGEOT06: Palaeontology	50	10	60	2	
		Practi-cal		USGEOP03: Practical	30	-	30	2	
	II	I		USGEOT07: Sedimentary Petrology and Metamorphic Petrology	50	10	60	2	150
		II		USGEOT08: Indian Stratigraphy	50	10	60	2	
		Practi-zcal		USGEOP04: Practical	30	-	30	2	

Bachelor of Science
B.Sc. (Geology)
Semester –I / II/ III / IV / V / VI

Time: 3 Hours] **[Max. Marks: 50**

Note:1) All questions are compulsory and carry equal marks.
2) Draw Neat and Labeled diagram wherever necessary.

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1. Long Question from unit I	10 marks
OR	
a. Short Question from unit I	5 marks
b. Short Question from unit I	5 marks
2. Long Question from unit II	10 marks
OR	
a) Short Question from unit II	5 marks
b) Short Question from unit II	5 marks
3. Long Question from unit III	10 marks
OR	
a) Short Question from unit III	5 marks
b) Short Question from unit III	5 marks
4. Long Question from unit IV	10 marks
OR	
a) Short Question from unit IV	5 marks
b) Short Question from unit IV	5 marks

Q5 Very short questions (Solve any Ten)	10 marks
a) (From Unit 1)	1
b) (From Unit 1)	1
c) (From Unit 1)	1
d) (From Unit2)	1
e) (From Unit 2)	1
f) (From Unit 2)	1
g) (From Unit3)	1
h) (From Unit3)	1
i) (From Unit3)	1
j) (From Unit4)	1
k) (From Unit4)	1
l) (From Unit4)	1

General Instructions

- Theory examination for all Semesters will be at university level
- The examination of Semester III shall comprise of two theory papers of 3 hours duration of 50 marks each. Ten marks will be allotted for internal assessment for each theory paper.
- The examination of Semester IV shall comprise of two theory papers of 3 hours duration of 50 marks each. Ten marks will be allotted for internal assessment for each theory paper.
- Question paper will consist of five questions and each question will be of 10 marks.
- Five questions will be based on four units with internal choice.
- Fifth question will be compulsory with questions from each of four units having equal weightage and there will be no internal choice.
- Practical examination will be of 3 hours duration and separately for each semester having 30 marks each.
- Practical Examination for Odd Semester will be at college level and for Even semester at university level with external examiner.
- The syllabus is based on 6 theory periods and 6 practical periods per week.
- The marks will be given for all examinations and they will be converted into grade points. The final grade card will have marks, credits, grades, grade points, SGPA and CGPA.

Distribution of Practical Marks (Semester III)		
1	Practical	24 marks
2	Certified practical record book	03 marks
3	Viva-voce	03 marks
	Total	**30 marks**

Distribution of Practical Marks (Semester IV)	
Practical	21 marks
Certified practical record book	03 marks
Certified tour report/field diary	03 marks
Viva-voce	03 marks
Total	**30 marks**

B.Sc.-II Year

SEMESTER – III

Geology

USGEOT05
Syllabus
B.Sc. II
GEOLOGY
SEMESTER III
Paper I

Igneous Petrology

Unit I

Petrology : Definition. Crust and its composition .Classification of rocks. Rock cycle. Igneous Petrology: Forms of Igneous rocks. Structures of igneous rocks: Vescicular and amygdaloidal Structure, blocky lava and ropy lava, pillow and flow structure, columner structure, jointing, Sheet and platy structures

Unit II

Textures and microstructures of igneous rocks. Classification of igneous rocks. Mineralogical Characteristics of acid, alkaline, basic and ultra basic igneous rocks.

Unit III

Magma : Definition, Composition and origin. Bowen's reaction series , Magmatic differentiation and Assimilation and hybrid rocks.

Unit IV

Phase rule and phase equilibria: Concept of System Phase and Component . Chemical potential and phase rule. Phase equilibria and their applications in petrology. Basic principles of phase equilibria in Crystallisation of uni- component and bi-component magma.

Books Recommended:

1) G. W. Tyrell: Principles of Petrology (1998) B.I. Publications Pvt. Ltd. New Delhi
2) Hatch, Wells and wells: Petrology of igneous rocks (1984) CBS Publishers, New Delhi
3) Hall : Igneous Petrology (1987) Longman ELBS
4) Nackolds Knox and Chinner : Petrology for Students (1978) Combridge Univ. press, London
5) Turner and Verhoogen: Igneous and Metamorphic Petrology(1987)CBS Publishers
6) Phillipotts : Igneous and Metamorphic Petrology(1992)Prentice Hall
7) Ehlers and Blatt : Petrology: Igneous, Sedimentary and Metamorphic (1981) CBS, New Delhi
8) Moorhouse : The study of rocks in thin sections (1985) CBS Publishers
9) Williams,Turner and Gilbert: Petrography : An introduction to study of rocks in thin sections (1985) CBS Publishers.

USGEOT06
GEOLOGY
SEMESTER III
Paper II

Palaeontology

Unit I

Definition and scope of palaeontology. Processes of fossilization. Preservation of organisms. Elementary ideas about origin of Life , evolution and fossil record. Application of palaeontological data in economic geology, palaeoecology, evolution,and Stratigraphy . Palaeogeographics and palaeo climatic reconstructions. Basic ideas about micro-palaeontology and microfossils.

Classification, diagnostic morphological characters, environment and geological distribution of Brachiopoda.

Unit II

Classification, diagnostic morphological characters, environment and geological distribution of the following : Pelecypoda, Gastropoda and Cephalopoda.

Unit III

Classification, diagnostic morphological characters environment and geological distribution of the following : Foraminifera, Graptoloidea, Echinoidea and Crinoidea.

Unit IV

Classification, diagnostic morphological characters environment and geological distribution of the following : Anthozoa, Trilobita and Plants of Gondwana period.

Book Recommended:

Palaeontology:

1) E.N.K Clarkson (1986) Invertebrate Palaeontology and Evolution ELBS Allen and Unwin , London
2) H.H. Swinnerton (1973) Fossils, Williams Collins Son's and Co.Ltd.
3) R.R Shrock & W.H. Twenhofel (1999) Principles of Palaeontology ,CBS publishers.
4) Henry Woods (1985) Invertebrate Palaeontology CBS publishers
5) R. C. Moore C.G. Lalicker and A.G. Fisher (1997) Invertebrate Fossils CBS publisher
6) W.C. Steam and R.L. Carroll(1989) Palaeontology : The record of Life. John Wiley and Sons Inc.) New York.
7) C.A. Arnold (1947) An Introduction to Palaeobotany McGraw Hill. New York.
8) R.M Black (1970) The elements of invertebrate palaentology Cambridge university Press
9) M.A. Koregave (1998) Fundamentals of Invertabrate Palaeontology. Book World Enterprises, Mumbai.

USGEOP03
PRACTICALS

PETROLOGY:

Megascopic study of the following rock types:

Igneous Rocks:

Granite, Granodiorite, Diorite, Anorthosite, Lamprophyre, Porphyries, Gabbro, Norite, Dolerite, Diabase, Peridotite, Dunite, Pyroxenite Obsidian, Pitchstone, Pumice, Trachyte, Andesite, Phonolite, Tuff, Basalt, Rhyolite, Charnockite.

PALAEONTOLOGY

Morphological characters, identification, age and sketches of the following fossils:
Nummulite, Rhynconella, Terebratula, Productus, Spirifer, Pecten, Ostrea, Trigonia, Cerithium, Conus, Turritella, Physa, Ceratites, Orthoceras, Nautilus, Belemnites, Monograptus, Cidaris, Hemiaster, Paradoxide, Calymene, Zaphrentis, Cyathophyllum, Calceola.

Alethopteris, Lepidodendron, Calamites, Glassopteris, Gangamopteris, Vertibraria, Cordiates, Ptilophyllum.

B.Sc.-II Year

SEMESTER – IV

Geology

USGEOT07
Syllabus
B.Sc. II
GEOLOGY
SEMESTER IV
Paper I

Sedimentary Petrology and Metamorphic Petrology

Unit I

Definition –Sedimentology and Sedimentary petrology. Processes involved in the formation of sedimentary rocks : Weathering, transportation, deposition , consolidation , lithification and diagenesis. Sedimentary textures, structures and mineralogy of sedimentary rocks. Concept of sedimentary facies.

Unit II

Classification of sedimentary rocks: Residual, clastic, chemical and organic sedimentary deposits.

Unit III

Definition of metamorphism. Agents,kinds and products of metamorphism. Structures, textures and classification of metamorphic rocks.

Unit IV

Basic concepts about grade, zones and facies of metamorphism. Metamorphism of pelitic, acidic, basic and calcareous rocks.
Metasomatism- Definition, metasomatic processes, granitisation and migmatisation with suitable Indian examples.

Books Recommended :

1) *G.W.*Tyrell (1998) Principles of Petrology B.I. Publications Pvt. Ltd., New Delhi.
2) S.R. Nackolds, R.W.O.B. Knox, G.A. Chinner (1978) Petrology for students. Cambridge University Press, London.
3) E.G. Ehlers and H.Blatt (1981) Petrology : Igneous, Sedimentary and Metamorphic. CBS Publishers, New Delhi.
4) F.J. Pettijohn (1957)Sedimentary Rocks. Oxford and IBH Pub. Co.,New Delhi.
5) M.E. Tucker(1988) Sedimentary Petrology: An Introduction. ELBS.
6) N.W. Gokhale (1998)Fundamentals of Sedimentary Rocks. CBS Publishers.
7) J.D. Collinson and D.B. Thompson (1994) Sedimentary Structures.CBS Pub.
8) B.W.D. Yardley (1989) An Introduction to Metamorphic Petrololgy. Longman ELBS.
9) F.J.Turner (1980) Metamorphic Petrology. McGraw Hill, New York.
10) W.W. Moorhouse (1985)The study of Rocks in Thin Sections. CBS Publishers.
11) H.Williams,F.J.Turner and C.M.Gilbert (1985)Petrography : An Introduction to the Study of Rocks in Thin Sections. CBS Publishers.

USGEOT08
GEOLOGY
SEMESTER IV
Paper II

Indian Stratigraphy

Unit I

Geological time Scale. Methods of collecting stratigraphic data. Principles of Stratigraphy. Stratigraphic Classification: Lithostratigraphic, Chronostratigraphic and biostratigraphic Units, Stratigraphic Correlation.Physical and structural subdivisions of Indian subcontinent and their characterstics. Classification , Geographic distribution, lithological characteristics and economic importance of Dharwar Supergroup of Peninsular India and associated granitic rocks.

Unit II

Classification, geographic distribution, lithological Characteristic, and economic importance of the following :-
Sausar Group, Sakoli Group, Dongargarh Supergroup, Aravalli Supergroup and associated gneissic rocks, Iron Ore Group. Cuddapah Supergroup of Cuddapah basin, Kaladgis, Pakhals, Penganga Formation, Delhi Supergroup, Shimla Formation. Vindhyan Supergroup of Vindhyan basin , Kurnool Supergroup, Chattisgarh Supergroup.

Unit III

Classification, geographic distribution, lithological characteristics, fossil content and economic importance of the following:
Palaeozoic succession of Spiti valley, Gondwana Supergroup. Triassic of Spiti, Jurassic of Kutch, Rajasthan and Spiti.

Unit IV

Classification, geographic distribution, lithological characteristics, fossil content and economic importance of the following.
Cretaceous of Narmada valley, Trichinopoly, Spiti and Lameta Formation. Deccan Traps. Tertiary of Assam and coastal areas of India. Siwalik Group. Karewa Formation of Kashmir. Stratigraphy of Maharashtra

Books Recommended:
Indian Stratigraphy:

1) Ravindra kumar (1985) Fundamentals of Historical Geology and Stratigraphy of India. Wiley Eastern Ltd., New Delhi.
2) M.S. Krishnan (1982) Geology of India and Burma CBS Publishers.
3) D.N. Wadia (1998) Geology of India. Tata McGraw Hill, India.
4) G.G. Deshpande (1998) Geology of Maharashtra. Geological Society of India, Bangalore.
5) Ramkrishnan and Vaidhyanadhan: Geology of India,Volume I and II, Geological Society of India, Bangalore.

USGEOP04
PRACTICALS

PETROLOGY:

Microscopic study of the following rock types:

Igneous Rocks:

Granite, Granodiorite, Diorite, Anorthosite, Lamprophyre,Porphyries, Gabbro, Norite Dolerite, Diabase, Peridotite, Dunite, Pyroxenite, Obsidian, Pitchstone, Pumice, Trachyte Andesite, Phonolite, Tuff, Basalt,Rhyolite,Charnockite

Megascopic and microscopic Study of the following rock types:

Sedimentary Rocks:

Conglomerate, Breccia, Grit, Arkose, Graywacke, Arenite, Sandstone, Shale, Clay, Marl, Limestone, Bauxite , laterite, Agglomerate, Tufa, Chert, Coal.

Metamorphic Rocks :

Hornfels, slate, phyllite, Schist, Gneiss, Granulite, Amphibolite, Quartzite, Marble, Khondalite, Gondite, Kodurite, Mylonite, Eclogite.

FIELD WORK:

Every Student should attend field work for one week duration and submit field notes, geological specimens and a report. The field work shall be treated as a part of practical examination of Semester IV and is Compulsory and shall be assessed by teacher and Head of the Department. Marks are assigned on field work.