



KARNATAK UNIVERSITY, DHARWAD
ACADEMIC (S&T) SECTION
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ



Tele: 0836-2215224
e-mail: academic.st@kud.ac.in
Pavate Nagar, Dharwad-580003
ಪಾವಟೆ ನಗರ, ಧಾರವಾಡ - 580003

NAAC Accredited
'A' Grade 2014

website: kud.ac.in

No. KU/Aca(S&T)/SVB-03/BOS /Geology (UG) /20-21 ೨೨೨

Date: 16 OCT 2020

NOTIFICATION

Sub: Regarding introduction of the syllabus of Geology UG under C.B.C.S. w.e.f. the academic year 2020-21 & onwards.

- Ref: 1. UGC Letter DO No. 1-1/2016(SECY), dt. 10.08.2016.
2. Special BOS Res. No. 01, dt. 04.07.2020.
3. Special Faculty Res. No. 05, dt. 11.08.2020.
4. Special Academic Council Res. No. 36, dt. 21.08.2020.
5. Vice-Chancellor's order dated - 07-10-2020

Adverting to the above, it is hereby notified to the Principals of all constituent and affiliated degree colleges coming under the jurisdiction of Karnatak University, Dharwad that the Geology UG syllabus for I to VI Semester which is annexed herewith in Annexure-A is introduced under C.B.C.S. from the academic year 2020-21 & onwards.

Hence, the contents of this notification may please be brought to the notice of the students and all the concerned. The prescribed C.B.C.S. syllabus may also be obtained through K.U.website (www.kud.ac.in).

(Dr. Hanumantappa K.T)
REGISTRAR

To,

1. The Chairman, BOS Geology (UG), Dept. of Geology, K.U.Dharwad.
2. The Chairman, Dept. of Geology, K.U.Dharwad.
3. The Principals of all the constituted and affiliated degree colleges under the jurisdiction of Karnatak University, Dharwad. (The same may be sent through e-mail)
4. The Registrar (Evaluation), K.U.Dharwad.

Copy fws to:

1. Dr. Ch.Ramesh, Dean, Faculty of Science & Tech., Dept. of Botany, K.U.Dharwad.
2. The Director, IT Section, Examination Section, K.U.Dharwad for information and to upload on K.U.Website (www.kud.ac.in).

Copy to:

1. PS to Vice-Chancellor, K.U.Dharwad.
2. S.A. to Registrar, K.U.Dharwad.
3. O.S., Exam UG / Confl / QP / GAD Section, K.U.Dharwad.
4. The System Analyst, Computer Unit Exam Section, K.U.Dharwad.

Karnatak University Dharwad



Syllabus for B. Sc. Geology (General)

**SIX SEMESTER COURSE UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)**

2020-21 Onwards

**PROCEEDINGS OF THE BOS MEETING IN GEOLOGY (UG) HELD ON 4th July,
2020 at DEPARTMENT OF STUDIES IN GEOLOGY, KARNATAK UNIVERSITY,
DHARWAD.**

Dated: 04.07.2020

Place: Dharwad-03

Members Present:

- | | |
|-----------------------|----------|
| 1. Dr. A. Sreenivas | Chairman |
| 2. Dr. S. C. Chougale | Member |
| 3. Dr. J. T. Gudagur | Member |
| 4. Dr. R.Y. Budihal | Member |

Members Absent

- | | |
|---------------------|--------|
| 5. Dr. R. Ravikumar | Member |
|---------------------|--------|

Chairman, BOS in Geology (PG and UG), welcomed the members to the meeting and presented the agenda. The proceedings of the meetings are as follows;

1. Regarding introduction of CBCS pattern in Undergraduate course.

The Board of Studies (BOS) in Geology (UG) at its meeting held on **4th July, 2020** recommends the proposed revised semesterised draft Syllabus for Geology (General) course of studies under **CBCS** has been prepared by the **U.G. Board of Studies in Geology, K.U.**, suppose to be considered for the implementation from the academic year 2020-21 onwards.

2. Syllabus for the B.Sc Course in Geology of the Karnatak University, Dharwad, under CBCS and CAGP Regulations-2020.
 - a) The approved syllabus as per “CBCS and CAGP REGULATIONS-2020” of the Karnatak University for **I, II, III, IV, V and VI semesters** in course of Geology along with Model Question papers are annexed herewith.

3. **Any other matter: Nil**

Chairman thanked all the members for their participation and contribution in framing the syllabus for **I, II, III, IV, V and VI semesters of B.Sc Geology.**

CONTENTS

Sl.No.	Description
1.	Introduction
2.	Aims and Objective
3.	Consolidated Scheme for all Semesters
4.	# Core Syllabus
	i. First Semester Core Course: Syllabus
	ii. Second Semester Core Course: Syllabus
	iii. Third Semester Core Course: Syllabus
	iv. Fourth Semester Core Course: Syllabus
	v. Fifth Semester Core Course: Syllabus
	vi. Sixth Semester Core Course: Syllabus

1. Introduction

The Karnatak University resolved to introduce Choice Based Credit System (CBCS) from the Academic Year 2020-21 onwards in tune with directives of the University Grants Commission to implement uniform grading system in universities. The primary aim of CBCS is to facilitate mobility of students across institutions within the country and abroad. The draft syllabus was modified by incorporating suggestions from participants in the workshop.

2. Aims and Objectives

The B. Sc. Geology programme is designed to:

1. Provide basic knowledge of different branches of Geology at graduate level.
2. Understand the Earth and its various processes, both external and internal that shape it.
3. Assess the Earth as source of natural resources such as water, minerals, rocks, ores, coal and oil and devise ways and means to extract these for benefit of mankind.
4. Realize the threat of natural disasters and work out ways to mitigate its effects.
5. Recognize the Earth as an environmental realm and chalk out plans for conserving its resources.

OTHER FEATURES

- 1. Intake capacity / number of students:** As per University Norms
- 2. Teacher's qualifications:** As prescribed by norms.
- 3.** Work load details should be as per Apex body/UGC/State Govt/University norms.
- 4. Library:** List of books has been mentioned paper wise in the syllabi.
- 5. Specific equipments:** Necessary to run the Course.

Rocks and minerals specimens, fossil specimens, petrological microscopes, field equipments, maps, charts, models, Aerial photographs, satellite imageries, stereoscopes, slide projector, OHP/LCD, Computers and necessary software's and operating systems etc.

LABORATORY SAFETY MEASURES:

General Safety Rules for Laboratory Work:

List of Equipments Needed For Laboratory Safety

- Fire extinguisher
- First Aid Kit
- Good earthing and insulated wirings for electrical supply
- Standard operated procedure manuals for instrument, map, specimens etc.

Instructions for Safety in Laboratory

- Any injury while handling rocks and mineral must be reported to teacher in charge of practically immediately.
- In case of fire, switch off all electric connections.
- Make your workplace clean before leaving the laboratory.
- Know the place of fire extinguisher, first aid box.
- Do not use cell phones in laboratory.

DO's

- Always wear shoes in the laboratory.
- Maintain separate record book for practical work.
- Maintain silence, cleanliness and discipline in the laboratory.
- Handle the laboratory equipment, rock, and mineral specimens carefully.
- Follow the standard operation procedure of instrument.

DON'T

1. Don't take apparatus out of laboratory.
2. Don't eat or drink any food in laboratory.
3. Don't enter or leave the laboratory without permission.

Fieldwork: Geological fieldwork in selected areas as specified in DSC and DSE papers, for about 05 to 07 days under guidance is compulsory during 5th /6th Semester. Submission of fieldwork report along with specimens collected is also compulsory.

Field project: Related to geology like Well inventory, Resistivity survey in the area or any other work related to geology.

GUIDELINES FOR FIELD WORK

1. During study tour, more emphasis be given to field relations of rocks, collection of specimens, their labeling and mapping.
2. Students are advised to carry field equipments–viz. hammers, clinometers/Brunton compass, magnifying lens, tape, maps/toposheet, field note books, writing and drawing material as well as haversack for collection of specimens.
3. Field notes should be taken under the guidance of teacher in-charge incorporating photographs, sketches and measurement of different features.
4. Strict discipline and safety measures must be followed under the guidance of teacher in-charge.
5. Preparation of the study tour report and its presentation along with field collection at the time of practical examination is compulsory.

ANNEXURE – 1A
CBCS COURSE STRUCTURE FOR B.SC GEOLOGY (General) 2020-21 ONWARDS

YEAR	SEM ESTE R	*CORE			ELECTIVE			ABILITY ENHANCEMENT COURSES						TOTAL CREDITS
		DSC (12)			**DSE (2)			***SEC (4)			AECC (2)			
		Course	Credits	L+T+P	Course	Credits	L+T+P	Course	Credits	L+T+P	Course	Credits	L+T+P	
1st Year	I	DSC-1A	4+2=6	4+0+4							English- 1	2+1= 3	2+1+0	26
		DSC-2A	4+2=6	4+0+4							MIL- 1	2+1= 3	2+1+0	
		DSC-3A	4+2=6	4+0+4							Environmental Studies	2+0= 2	2+1+0	
	II	DSC-1B	4+2=6	4+0+4							English- 2	2+1= 3	2+1+0	26
		DSC-2B	4+2=6	4+0+4							MIL- 2	2+1= 3	2+1+0	
		DSC-3B	4+2=6	4+0+4							Constitution of India	2+0= 2	2+1+0	
2nd Year	III	DSC-1C	4+2=6	4+0+4							English- 3	2+1= 3	2+1+0	24
		DSC-2C	4+2=6	4+0+4							MIL- 3	2+1= 3	2+1+0	
		DSC-3C	4+2=6	4+0+4										
	IV	DSC-1D	4+2=6	4+0+4							English- 4	2+1= 3	2+1+0	24
		DSC-2D	4+2=6	4+0+4							MIL- 4	2+1= 3	2+1+0	
		DSC-3D	4+2=6	4+0+4										
3rd Year	V				DSE-1E	4+2=6	4+0+4	SEC-1E	2+0=2	2+0+0				22
					DSE-2E	4+2=6	4+0+4	SEC-2E	2+0=2	2+0+0				
					DSE-3E	4+2=6	4+0+4							
	VI				DSE-1F	4+2=6	4+0+4	SEC-1F	2+0=2	2+0+0				22
					DSE-2F	4+2=6	4+0+4	SEC-2F	2+0=2	2+0+0				
					DSE-3F	4+2=6	4+0+4							
Total			72			36		08				28		144

Note:

- Each DSC/DSE shall have 60hrs syllabus / semester for 100 marks in theory (80 Sem. End exams +20 IA Exam) and 52 hrs practical/sem for 50 marks (40 Sem. End exams +10 IA Exams).
- English/MIL Shall have 45 hrs syllabus / semester for 100 marks in theory (80 Sem. End exams +20 IA Exam).
- Environmental Science/ Constitution of India / SEC shall have 30 hrs syllabus / semester for 50 marks in theory/ Practical (40 Sem. End exams +10 IA Exam).

L+T+P= Lecturing in Theory + Tutorial + Practical Hours per Week (No tutorial for practical subject).

* If the core course is Mathematics, there shall be two papers of 75 marks each. Then L+T+P = (2X3) + (2X1) + 0, but credit shall be 6 only.

** Each DSE shall have at least two papers and student shall choose any one paper from each DSE.

*** SEC shall be from any one DSC and study two each in 5th and 6th semesters (SEC may be practical or theory for 2 credits only).

DISCIPLINE SPECIFIC CORE COURSES (DSCC - 4) General Structure

Semester	Paper Structure	Core Course
I	GLG-SC-116	General Geology and Structural Geology
	##	##
	##	##
II	GLG-SC-226	Crystallography and Mineralogy
	##	##
	##	##
III	GLG-SC-336	Petrology
	##	##
	##	##
IV	GLG-SC-446	Stratigraphy and Palaeontology
	##	##
	##	##

SKILL ENHANCEMENT COURSE (SEC- 4) General Structure

Semester	Paper Structure	Papers available
V	GLG-SE-512	Geomorphology and Geo-tectonics
	GLG-SE-522	Environmental Geology
VI	GLG-SE-632	Geochemistry
	GLG-SE-642	Photo Geology and Remote Sensing

DISCIPLINE SPECIFIC ELECTIVE (DSE – 2+2) General Structure

Semester	Paper Structure	Papers available for selection
V	GLG-SET-516 Paper-I & II	P-I Economic Geology and Hydrogeology P-II Introduction to Geophysics
	##	##
	##	##
VI	GLG-SET-626 Paper-I & II	P-I Elements of Applied Geology P-II Mineral Resources
	##	##
	##	##

Note: ## From other disciplines.

GLG= GEOLOGY

SC= SPECIFIC COURSE

SE= SPECIFIC ELECTIVE

DE= DISCIPLINE ELECTIVE

Karnatak University, Dharwad
CBCS syllabus for Under Graduate Programme in Geology (opt.) as **DISCIPLINE SPECIFIC COURSE (DSC)**
Effective from 2020-21

Semester	Course Code	Name Of The Course	Theory/ Practical	Instruction Hrs/Week	Total Period	Duration Of Exam	Marks Obtained		Total Marks	Credits
							Internal (CA)	External (ESE)		
I	(DSC) GLG-SCT-(A)-116	General Geology and Structural Geology	Theory	04	60	03 Hrs	20	80	100	04
	(DSC) GLG-SCP-(A)-116	General Geology and Structural Geology	Practical	04	52	03 Hrs	10	40	50	02
II	(DSC) GLG-SCT-(B)-226	Crystallography and Mineralogy	Theory	04	60	03 Hrs	20	80	100	04
	(DSC) GLG-SCP-(B)-226	Crystallography and Mineralogy	Practical	04	52	03 Hrs	10	40	50	02
III	(DSC) GLG-SCT-(C)-336	Petrology	Theory	04	60	03 Hrs	20	80	100	04
	(DSC) GLG-SCP-(C)-336	Petrology	Practical	04	52	03 Hrs	10	40	50	02
IV	(DSC) GLG-SCT-(D)-446	Stratigraphy and Palaeontology	Theory	04	60	03 Hrs	20	80	100	04
	(DSC) GLG-SCP-(D)-446	Stratigraphy and Palaeontology	Practical	04	52	03 Hrs	10	40	50	02
V	(DSE) *GLG-DET-516-(E)-P-I/P-II	P-I-Economic Geology and Hydrogeology P-II- Geology of Karnataka	Theory	04 / 04	60 / 60	03 Hrs	20	80	100	04
	(DSE) GLG-DEP-516-(E)-P-I/P-II	P-I-Economic Geology and Hydrogeology P-II	Practical	04	52	03 Hrs	10	40	50	02
VI	(DSE) *GLG-DET-626-(F)P-I / P-II	P-I-Elements of Applied Geology P-II- Dissertation/ Project Work	Theory/ Self Study	04 / 04	60 / 60	03 Hrs	20	80	100	04
	(DSE) GLG-DEP-626-(F)P-I/P-II	P-I-Elements of Applied Geology P-II- Dissertation/ Project Work	Practical	04	54	03 Hrs	10	40	50	02
Total	*Candidate shall choose either Paper-I or P-II but not both in DSE Theory			48 Hrs	672/120		180	720	900	36

SKILL ENHANCEMENT COURSE (SEC) FOR GEOLOGY OPTED AS DSC

Semester	Course Code	Name Of The Course	Theory/ Practical	Instruction Hrs/Week	Total Period	Duration Of Exam	Marks Obtained		Total Marks	Credits
							Internal (CA)	External (ESE)		
V	GLG-SE-51E2	Geomorphology and Geo-tectonics	Theory	02 Hrs	30	1.5 Hrs	10	40	50	02
	GLG-SE-52E2	Environmental Geology	Theory	02 Hrs	30	1.5 Hrs	10	40	50	02
VI	GLG-SE-61F2	Geochemistry	Theory	02 Hrs	30	1.5 Hrs	10	40	50	02
	GLG-SE-62F2	Photo Geology and Remote Sensing	Theory	02 Hrs	30	1.5 Hrs	10	40	50	02
Total				08 Hrs	120		40	160	200	08

SYLLABY AND COURSES OF STUDY IN GEOLOGY (B.Sc CBCS Pattern)

For Examinations to be held in the year 2020, 2021 and 2022

1st SEMESTER

Discipline Specific Course (DSC) under CBCS

Title of the Course: General Geology and Structural Geology

Course Code: (DSC) GLG-SCT-(A)-116

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk
			Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit-1: General Geology (30 Hours)

1. Introduction to Geology, branches of geology and its relation to other branches of sciences. Scope and importance.
2. Earth and Solar System: Origin of Earth-fundamental regularities, size, shape, mass and density. Theories of Origin- Nebular, Planetismal and Big-bang. Age of the earth- U-Pb, Sr-Rb and C14 Methods.
3. Brief idea about interior of Earth and its composition- Crust, Mantle and Core.
4. Weathering: Factors controlling weathering. Types of weathering- Physical/Mechanical, Chemical and Biological. Effects of weathering.
5. Earthquake: Earthquake terminology. Nature of seismic waves, their intensity, magnitude scale, seismograph and recording earthquakes. Classification causes and effects of earthquakes. Prediction of earthquake, earthquake zones of India. Use of seismic waves in the study of earth's internal constitution.
6. Volcanoes and volcanism; Types and distribution of volcanoes; products of volcanoes.
7. Introduction to Igneous, Sedimentary and Metamorphic rocks and their distinguishing characters.

Unit-2: Structural Geology (30 Hours)

1. Introduction: Definition and Scope of Structural Geology; Concept of non-diastraphic and diastraphic structures. Non-diastraphic structures: stratification, current or cross bedding, graded bedding, ripple marks, unconformities, mud cracks and rain prints, flow layers, primary joints, vesicular and amygdaloidal structures and pillow structure.
2. Contours, topographic and geological map. Elementary idea of bed, Strike and Dip and its types. Brunton compass and uses.
3. Elementary idea of types of deformation. Concept of stress and strain; Elasticity, Plasticity and Brittleness. Diastraphic structures: Planar and linear structures. Basic concepts of Lineation and Foliation.

4. Brittle structure: Fault and Faulting: Definition of fault as a planar zone; terms associated with Faults/fault zones. Movements along faults; absolute, relative, apparent, translational and rotational. Slips, separations, shift along faults. Effects of faulting on disrupted strata. Geometric and Genetic classification of faults. Recognition of faults in the field
5. Joints: Definition and general characteristics of joints; Geometric and genetic classification of joints with examples.
6. Unconformity: Definition, Structural classification of unconformities, Recognition of unconformity in the field
7. Ductile structure: Fold and folding; Nomenclature and types of fold.

GEOLOGY PRACTICAL
(DSC)GLG-SCP-(A)-116 [Marks 40 + 10 = 50]

Unit-1: General Geology

1. Study of contours: Pattern of contours to indicate various topographical features.
2. Reading of topographical maps of the Survey of India; Interpretation of topographic maps; Drawing of profile.
3. Study of geomorphological features from topographic maps.
4. Model study of different geomorphic features.

Unit-2: Structural Geology

1. Study of Brunton Compass, Identification of different types of folds/faults, joints and unconformity from block models.
2. Exercise on structural maps: Preparation of cross-section profile from geological map.
 - a. Horizontal and inclined strata with and without intrusion.
 - b. Inclined strata with faults; with and without intrusions.
 - c. Map showing combined features such as faults, folds, unconformities and intrusions; unconformities without intrusions (at least a minimum of 2 (two) maps in each types to be given during practical's.
 - d. Completion of outcrops.
 - e. Solving Strike and Dip problems. (Minimum of 2 (two) problems from each set.

Books Recommended

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

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**).

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

First Semester

GEOLOGY

Paper: GENERAL GEOLOGY AND STRUCTURAL GEOLOGY

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 1) All questions are compulsory.**
- 2) Draw neat labelled diagrams wherever necessary.**
- 3) Figures to the right indicates full marks**

SECTION: A

I. Answer any FIVE questions **5X2=10 Marks**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

SECTION: B

II. Answer any SIX of the questions **6X5=30 Marks**

- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.

SECTION: C

III. Answer any FOUR questions **4X10=40 Marks**

- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

PRACTICAL MODEL PAPER

B.Sc Degree Practical Examination

First Semester

GEOLOGY

Paper: GENERAL GEOLOGY AND STRUCTURAL GEOLOGY

Credits: 1

Time: 03 Hours

Max.Marks:40

1. Identify and add a note on the given geomorphological feature from model/chart.
08 Marks
2. Interpretation and describing the relief, slope, drainage pattern and other features of the given Toposheet No_____ **07 Marks**
3. Describe topography & Geology in the given Geological map 'A' & draw a section along X-Y line. **08 Marks**
4. Solve the dip and strike problems 1 and 2 on the basis of given data . **07Marks**
5. Lab Record and Viva-voce **10 Marks**

2nd SEMESTER

Discipline Specific Course (DSC) under CBCS

Title of the Course: **Crystallography and Mineralogy**

Course Code: (DSC) GLG-SCT-(B)-226

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit-1: Crystallography (20 Hours)

1. Introduction: Definition, Crystal structure and morphology of crystal. Crystallographic axes, axial angles and axial ratio. The unit cell, types of unit cells and Bravais Lattices. Crystal forms, form of symbol and types of forms. Zones, zone symbols and crystal habit.
2. Law of constancy of angle (Interfacial angle and their measurements), a contact goniometer and its uses, Crystal Parameters, Weiss and Miller system of notations.
3. Symmetry elements; Planes of symmetry, Axes of symmetry and centre of symmetry, Division of different crystals into six crystal systems.
4. Crystal Symmetry and forms of Normal classes of Cubic, Tetragonal and Hexagonal Systems.
5. Crystal Symmetry and forms of Normal classes of Orthorhombic, Monoclinic and Triclinic systems

Unit-2: Mineralogy (20 Hours)

1. Definition: Scope of Mineralogy; Definition of a mineral- classification of minerals into rock forming and ore forming minerals.
2. Twinning: Twin crystals, Twin axis, twin planes, composition planes, Twin Laws and different types of twinning.
3. Physical properties of minerals and their significance in the identification of the minerals. Moh's scale of hardness.
4. Silicate Minerals: definition and their classification based on silicate structure. Silicate Structures: Isomorphism, Polymorphism, Allotropy and Pseudomorphism.
5. Study of chemical composition and diagnostic physical properties of the following minerals: **Feldspars**; Plagioclase, Orthoclase, Microcline. **Pyroxene**; Augite, Diopside and Hypersthene. **Amphibole**: Actinolite and Hornblende. **Garnet**; Pyrope and Grossular. **Mica**; Muscovite and Biotite. **Olivine**.
6. Study of chemical composition and diagnostic physical properties of the following minerals: Quartz, Calcite, Chlorite, Andalusite, Enstatite, Kyanite, Sillimanite, Topaz and Zircon.

Unit-3: Optical Mineralogy (20 Hours)

1. Petrological Microscope: Construction and working. Nature of light; Reflection, Refraction of rays and Refractive index, Ordinary and Polarized light; Methods of polarization-Double refraction, and construction and working principles of Nicol prism.
2. Isotropic and Anisotropic minerals; Uniaxial and Biaxial; Optic axis. Accessory plates (Mica Plate, Gypsum Plate and Quartz Wedge) and their uses.
3. Common optical properties observed under plane-polarized and cross polars. Colour, Pleochroism, Form/Habit, Cleavage, Relief and Alteration. Isotrophism, Birefringence and Interference colour, Interference figures, Extinction angle, Twinning and Zoning.
4. Study of optical properties of the following minerals: Quartz, Orthoclase, Microcline, Plagioclase. Hypersthene, Hornblende, Garnet, Muscovite, Biotite, Olivine, Kyanite, Sillimanite, Calcite and Augite.

PRACTICAL (DSC)
GLG-SCP-(B)-226 [Marks 40 + 10 = 50]

Unit-1: Crystallography

1. Study of the forms and symmetry elements of crystals belonging to the holohedral classes of Isometric, Tetragonal, Hexagonal, Orthorhombic, Monoclinic and Triclinic systems with the help of either natural crystals or wooden and glass models.

Unit-2: Mineralogy

1. Identification of following minerals in hand specimen: Feldspars; Plagioclase, Orthoclase, Microcline. Pyroxene; Augite, Diopside and Hypersthene. Amphibole: Actinolite and Hornblende. Garnet; Pyrope and Grossular. Mica; Muscovite and Biotite. Olivine,
2. Quartz, Calcite, Chlorite, Andalusite, Enstatite, Kyanite, Sillimanite, Topaz, Zircon and Tourmaline.

Unit-3: Optical Mineralogy

1. Petrological Microscope: Construction and working. Construction and working principles of Nicol prism.
2. Study of optical properties of the following minerals in thin section: Quartz, Orthoclase, Plagioclase, Microcline, Hypersthene, Hornblende, Garnet, Muscovite, Biotite, Enstatite, Olivine, Kyanite, Sillimanite, Calcite,

Books Recommended

Name of the Book	Author	Publisher
1. A textbook of Mineralogy	Dana, E.S. and Ford, W.E., 2002.	(Reprints)
2. Essential of crystallography,	Flint, Y., 1975.	Mir Publishers.
3. An introduction to crystallography.	Phillips, F.C., 1963.	Wiley, New York.
4. Mineralogy.	Berry, L.G., Mason, B. and Dietrich, R.V., 1982.	CBS Publ.
5. Optical Mineralogy.	Nesse, D.W., 1986.	McGraw Hill.
6. Rutley's Elements of Mineralogy (Rev. Ed.).	Revised by. C.D.Gribble	Thomas Murby and Co.
7. Mineralogy.	Berry and Mason, 1961.	W.H. Freeman & Co.
8. Optical Mineralogy	Kerr, B.F., 1995.	5 th Ed. Mc Grew Hill, New York.
9. Elements of optical mineralogy.	N. H. and A. N. Winchell	Chapman & Hall, Ltd

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**)

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

Second Semester

GEOLOGY

Paper: CRYSTALLOGRAPHY AND MINERALOGY

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 1) All questions are compulsory.**
- 2) Draw neat labelled diagrams wherever necessary.**
- 3) Figures to the right indicates full marks**

SECTION: A

I. Answer any FIVE questions **5X2=10 Marks**

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

SECTION: B

II. Answer any SIX of the questions **6X5=30 Marks**

- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.

SECTION: C

III. Answer any FOUR questions **4X10=40 Marks**

- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

PRACTICAL MODEL PAPER

B.Sc Degree Practical Examination

Second Semester

GEOLOGY

Paper: CRYSTALLOGRAPHY AND MINERALOGY

Credits: 1

Time: 03 Hours

Max.Marks:40

1. Identify the crystal System and describe axial characters, elements of symmetry and the forms occurring in the crystal models from No. 1 to 4. **10 Marks**
2. Identify the given Mineral specimen megascopically after describing their physical properties, chemical composition, crystal system and at least two uses from No. 5 to 8. **10 Marks**
3. Identify the given minerals in thin sections after describing optical properties from No. 9 to 12. **10 Marks**
4. Lab Record and Viva-voce **10 Marks**

3rd SEMESTER

Discipline Specific Course (DSC) under CBCS

Title of the Course: Petrology

Course Code: (DSC) GLG-SCT-(C)-336

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit-1: Igneous Petrology(25 Hrs)

1. Magma: Definition, composition, types and origin; Forms of igneous rocks - Concordant and Discordant forms.
1. Crystallization of Unicomponent and Bicomponent (Mix-crystals); Bowen's Reaction Series. Textures; Definition and Description- Equigranular, Inequigranular and Intergrowth.
2. Classification of igneous rocks based on ;
 - a) Mode of Occurrence
 - b) Silica Percentage-Saturation, Oversaturation and Under saturation, CIPW & IUGS
 - c) Colour Index
 - d) Feldspar Content
 - e) Silica Saturation and
 - f) Alumina Saturation.

3. Origin of Igneous Rocks: Differentiation- by Liquid Immiscibility, crystallization, by Gravitational and Filtration; Role of volatiles in Differentiation.
4. Assimilation – Reactions between Basaltic magma and acidic igneous rocks; Basaltic magma and Sedimentary rocks; Reactions with Granitic magma and basic igneous rocks; Granitic magma and Sedimentary rocks;
5. Detailed Petrography of Granite, Rhyolite, Syenite, Dolerite, Gabbro, Basalt, Trachyte and Diorite.

Unit-2: Sedimentary Petrology (20 Hrs)

1. Introduction; Processes of formation of sedimentary rocks- weathering, transportation, deposition, lithification (diagenesis).
2. Textures: Definition, Clastic and Crystalline; Primary and Secondary textures. Grain size- The Wentworth Scale; Shape and Roundness (angularity).
3. Structures of sedimentary rocks; Primary and Secondary structures- Stratification, lamination, ripple marks, current bedding, graded bedding, mud cracks, rain prints.
4. Classification of sedimentary rocks- Clastic, Chemical and Biochemical sedimentary rocks.
5. Petrographic description of some important Siliciclastic and Carbonate rocks: Conglomerate, Breccia, Sandstone, Greywackes, Siltstone, Shale, Dolomite and Limestone.

Unit-3: Metamorphic Petrology (15 Hrs)

1. Introduction: General characters of Metamorphism- Agents and Kinds of Metamorphism.
2. Depth zone and Metamorphism; Facies, Zones and Grade of Metamorphism, Textures and Structures of Metamorphic rocks.
3. Kinds of metamorphism: Cataclastic metamorphism, Thermal metamorphism, Dynamo-thermal and Plutonic Metamorphism.
4. Descriptive petrography of Slate, Crushed breccia, Quartzite, Marble, Phyllite, Gneiss and Schist.

PRACTICAL

(DSC) GLG-SCP-(C)-336 [Marks 40 + 10 = 50]

Unit-1: Igneous Petrology

1. Megascopic study of the following rocks: Granite, Rhyolite, Syenite, Dolerite, Gabbro, Basalt, Trachyte and Diorite.
2. Study and identification of following rocks in thin sections under petrological microscope: Granite, Rhyolite, Syenite, Dolerite, Gabbro, Basalt, Trachyte and Diorite.

Unit-2: Sedimentary Petrology

1. Megascopic study of the following rocks: Conglomerate, Breccia, Sandstone, Greywackes, Siltstone, Shale, Dolomite and Limestone
2. Study and identification of following rocks in thin sections under petrological microscope: Sandstone, Shale, Limestone, Fossiliferous Limestone and Oolitic Limestone.

Unit-3: Metamorphic Petrology

1. Megascopic study of the following rocks: of Slate, Crushed breccia, Quartzite, Marble, Phyllite, Varieties of Gneiss and Schist.
2. Study and identification of following rocks in thin sections under petrological microscope: Quartzite, Marble, Granite Gneiss, Hornblende schist.

Books Recommended

Name of the Book	Author	Publisher
1. Igneous & Metamorphic petrology.	Turner, F.J. & Verhoogen, J., 1960,	McGraw Hill Co.
2. Igneous petrology.	Bose, M.K., 1997.	World press
3. Principles of Petrology	Tyrell, G. W., 1989.	Methuen and Co (Students ed.).
4. Petrology, Igneous, Sedimentary and Metamorphic rocks	Ehlers, WG, and Blatt, H., 1987.	CBS Publishers
5. The study of rocks in thin sections.	Moorhouse, W W., 1969.	Harper and sons
6. Principles of Sedimentology.	Friedman & Sanders, 1978.	John Wiley and sons.
7. Sedimentary rocks	Pettijohn, F. J., 1975.	Harper & Bros. 3rd Ed.
8. A text book of Sedimentology.	Prasad, C., 1980.	
9. Introduction to Sedimentology.	Sengupta. S., 1997.	Oxford-IBH.
10. Metamorphic petrology.	Turner, F. J., 1980.	McGraw Hill.
11. Petrology of Metamorphic Rocks.	Mason, R., 1978.	CBS Publ.
12. Petrogenesis of Metamorphic Rocks.	Winkler, H. G. C., 1967.	Narosa Publ.

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**)

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

Third Semester

GEOLOGY

Paper: PETROLOGY

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicates full marks

SECTION: A

- I.** Answer any FIVE questions 5X2=10 Marks
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.

SECTION: B

- II.** Answer any SIX of the questions 6X5=30 Marks
- 7.
 - 8.
 - 9.
 - 10.
 - 11.
 - 12.
 - 13.
 - 14.

SECTION: C

- III.** Answer any FOUR questions 4X10=40 Marks
- 15.
 - 16.
 - 17.
 - 18.
 - 19.
 - 20.

PRACTICAL MODEL PAPER
B.Sc Degree Practical Examination
Third Semester
GEOLOGY
Paper: PETROLOGY

Credits: 1

Time: 03 Hours

Max.Marks:40

1. Describe and identify the mega structures seen in the hand specimens of rocks 1 and 3. **08 Marks**
2. Describe and identify the rocks in the given hand specimens. Give their Classification, occurrence and origin from 04 to 09. **12 Marks**
3. Describe and identify with neat diagram the given rock textures in thin sections from 10 and 13. **10 Marks**
4. Lab Record and Viva-voce **10 Marks.**

4th SEMESTER

Discipline Specific Course (DSC) under CBCS

Title of the Course: Stratigraphy and Palaeontology

Course Code: (DSC) GLG-SCT-(D)-446

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit-1: Stratigraphy

1. Id
 Definition, Principles of Stratigraphy; Law of order of superposition, lateral horizontality, cross cutting relations, inclusions, chilled margins. Uniformitarianism, Catastropism. Stratigraphic Correlation: Paleontological and Non-Paleontological.
2. St
 Stratigraphic classification-Concepts of Time (Chronological), Time-Rock (Chronostratigraphic), Rock-Units (Lithostratigraphic) and Life-Rock (Biostratigraphic). Standard Geological time scale.

Unit-2: Indian Stratigraphy

1. Ph
ysiographic and tectonic divisions of India. A brief study of the **Precambrian Stratigraphy of India** of the following areas with respect to lithology, tectonics (structure), classification and igneous activity:
 - a) Dharwar Super Group (Karnataka)
 - b) Delhi Super Group
 - c) Vindhyan Super Group.
 - d) Cuddapah Super Group of Cuddapah basin
 - e) Kaladagi Group
 - f) Kurnool and Bhima Group

2. **Phanerozoic Succession of India:**
 - a) Palaeozoic succession of Kashmir and Spiti.
 - b) Classification, distribution and economic importance of Gondwana rocks in India.
 - c) Triassic succession of Spiti, Jurassic rocks of Kutch and Cretaceous of Trichinopoly.
 - d) Distribution and classification of Deccan Basalts.

 - e) Paleogene-Neogene sequences of Northwest Himalaya.

Unit-3: Palaeontology

1. P
alaeontology: Definition; Mode of preservation of fossils and Physico-chemical conditions for Fossilization. Types fossils (Index Fossil), Binomial nomenclature in taxonomy, Significance of fossils.

2. A
study of the morphological characters, classification and brief geological distribution of the following phylum; **Brachiopoda**, **Mollusca**-Lamellibranchia (Pelecypoda), Gastropoda, Cephalopoda. **Arthropoda**-Trilobita, **Echinodermata**-Echinoidea.

3. E
volutionary history of Equus (Horse). Evolutionary history of Homo (Man).

4. A
general idea on the plant fossils of Gondwana Flora, its distribution and palaeogeographic significance.

PRACTICAL
(DSC) GLG-SCP-(D)-446 [Marks 40 + 10 = 50]

Unit-1: Indian Stratigraphy

1. Preparation of Lithostratigraphic maps of India showing distribution of important geological formations. Pr
2. Deccan Traps, Kutch, Cuddapah Super Group, Vindhyan Super Group, Jurassic of Kutch, Cretaceous of Trichinopoly, Gondwana Super Group, Deccan Traps. D

Unit-2: Palaeontology

1. Identification of the following genera of fossils by their external morphology. Their stratigraphic ranges will also have to be studied: Id
 - a) **Brachiopoda**- Lingual, Productus, Orthis, Spirifer, Atrypa, Syringothyris, Rhynchonella, Terebratula and Pentamerus.
 - b) **Lamellibrachia**- Arca, Cardita, Exogyra, Gryphea, Ostrea, Pecten, Trigonina, Venus and Glycemeris.
 - c) **Gastropoda**- Bellerophon, Natica, Turritella, Cepraea, Murex, Voluta, Conus and Physa,
 - d) **Cephalopoda**- Orthoceras, Nautilus, Goniatite, Ceratites, Baculites, Belemnites and Perisphinctes.
 - e) **Trilobita**- Paradoxides, Trinucleus, Olenellus, Calymene and Phacops.
 - f) **Echinoidea**- Cidaris, Hemicidaris, Clypeaster, Echinolampus, Micraster and Hemiaster.
2. **Some important Plant Fossils.**
 - a) Glossopteris, Gangamopteris, Ptillophyllum, Vertebraria

[In case of non-availability of fossils, representative casts of fossils may be used in the Exercises.]

Books Recommended

Name of the Book	Author	Publisher
1. Geology of India	Wadia, D., 1973.	McGraw Hill Book Co
2. Geology of India and Burma	Krishnan, M.S., 1982.	6th Edition. CBS Publ
3. Fundamentals of Historical Geology & Stratigraphy of India	Ravindra Kumar, 1985.	Wiley Eastern
4. Principles of Invertebrate Paleontology	Shrock, R.R. & Twenhoffel, W.H.	CBS Publ
5. Outlines of Paleontology	Swinerton, H H.,	Edward Arnold Publishers

- | | | |
|--|----------------------------------|---------------------------|
| 6. Paleontology: Evolution & Animal Distribution | Jain, P.C. & Anantharaman, M.S., | 7. Vishal Publ |
| 8. Fossil Invertebrate | Lehmann, U., 1983 | Cambridge Univ. Press |
| 9. Organic evolution | Rastogi, 1988 | Kedrnath and Ramnath Publ |

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**)

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

Fourth Semester

GEOLOGY

Paper: STRATIGRAPHY AND PALAEOLOGY

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 1) All questions are compulsory.**
- 2) Draw neat labelled diagrams wherever necessary.**
- 3) Figures to the right indicates full marks**

SECTION: A

- I.** Answer any FIVE questions 5X2=10 Marks
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.

SECTION: B

- II.** Answer any SIX of the questions 6X5=30 Marks
- 7.
 - 8.
 - 9.
 - 10.
 - 11.
 - 12.
 - 13.
 - 14.

SECTION: C

- III.** Answer any FOUR questions 4X10=40 Marks
- 15.
 - 16.
 - 17.
 - 18.
 - 19.
 - 20.

PRACTICAL MODEL PAPER

B.Sc Degree Practical Examination

Fourth Semester

GEOLOGY

Paper: STRATIGRAPHY AND PALAEOONTOLOGY

Credits: 1

Time: 03 Hours

Max.Marks:40

1. Locate the type area and equivalents of the important geological formations and add a note on the available economic important minerals in the given political map of India. **10 Marks**
2. Describe and identify with a neat diagram given invertebrate fossils and write their classification, morphology and age from 01 to 05. **15 Marks**
3. Identify the given plant fossils 06 to 07 and write their classification, morphology and age. **05 Marks**
4. Lab Record and Viva-voce **10 Marks.**

5th SEMESTER

Discipline Specific Elective (DSE) under CBCS

Title of the Course: Paper I- Economic Geology and Hydrogeology

Course Code: (DSE) GLG-SET-(E)-556-P-I

(Candidate shall choose either Paper-I or Paper-II)

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit-1: Economic Geology and Prospecting

50 Marks Each

1. Definition of Ore, Gangue and Tenor; Metallic and Non-metallic Ore minerals; Strategic, Critical and Essential minerals.
2. Processes of formation of economic mineral deposits: Magmatic- Early and Late magmatic, Contact metasomatism, Hydrothermal processes (cavity filling and metasomatic replacement), Sedimentation processes, oxidation and supergene enrichment deposits (with Indian examples).
3. Study of mineralogy, mode of occurrence, origin and uses of the following economic mineral deposits with reference to Indian occurrences:
 - a) Metallic mineral deposits: Aluminium, Copper, Manganese, Iron, Lead, Zinc and Gold.
 - b) Non-metallic mineral deposits: Limestone, Gypsum, Mica, Magnesite, Sillimanite, Asbestos.

- c) Organic mineral deposits: Origin and occurrence of coal and petroleum in India.

Unit-2: Hydrogeology

1. Definition, Hydrological parameters: precipitation, evaporation, transpiration, infiltration; Hydrologic cycle.
2. Origin and age of ground water; Rock properties affecting Groundwater-Aquifers; Aquiclude, Aquifuse and Aquitard.
3. Water bearing properties of rocks: Specific retention and Specific yield. Darcy's Law and experiment, Permeability and types. Hydraulic Conductivity and Transmissivity. Porosity; types of porosity in rocks.
4. Vertical distribution of Groundwater; Zone of Aeration and Zone of Saturation. Types of Aquifers- Unconfined, Confined, Leaky and Idealized Aquifers.
5. Quality of Groundwater: Physical and chemical characters of groundwater. Suitability of groundwater for drinking and agricultural purpose.
6. Pollution of Groundwater: Pollution in relation to water use urban, industrial and agricultural sources and causes of pollution.
7. Surface and sub-surface geophysical and geological methods of groundwater exploration. Groundwater provinces of India.

PRACTICAL

(DSE) GLG-SEP-(E)-556-P-I [Marks 40 + 10 = 50]

Unit-1: Economic Geology

1. Recognition of the following economic minerals in hand specimens based on their physical properties: Calcite, Dolomite, Graphite, Malachite, Chalcopyrite, Pyrite, Hematite, Magnetite, Pyrolusite, Psilomelane, Sphalerite, Bauxite, Laterite, Asbestos, Gypsum, Galena, Cuprite, Zincite, Gypsum, Coal and Cinnabar.
2. Preparation of map showing distribution of important metallic (Aluminium, Copper, Manganese, Iron, Lead, Zinc and Gold) and non-metallic (Limestone, Gypsum, Mica, Magnesite, Sillimanite, Asbestos) mineral deposits and important oil and coal fields of India.

Unit-2: Hydrogeology

1. Methods of water analyses for physical and chemical parameters.
2. pH Electrical conductivity and total dissolved solids estimation in water.
3. Graphical representation of chemical quality data and water classification (C-S and Trilinear diagrams).

4. Preparation and interpretation of water table maps and vertical electrical sounding.

Books Recommended

Name of the Book	Author	Publisher
1. Indian Mineral Wealth	Brown, C. and Dey, A.K.1955	Oxford Univ
2. Ore Deposits of India	Gokhale, K.V.G.K. and Rao, T.C., 1983..	East West Press Pvt. Ltd
3. Economic Mineral Deposits	Jense, M.L. and Bateman A.M., 1981.	John Wiley and Sons
4. India's Minerals Resources	Krishnaswamy, S., 1979.	Oxford and IBH Publ
5. Industrial minerals and Rocks of India	Deb, S., 1980.	Allied Publishers Pvt. Ltd
6. Economic Geology	Umeshwar Prasad, 2003.	CBS Publishers and Distributers
7. Introduction to India's Economic Minerals	Sharma, N.L. and Ram, K.V.S., 1972.	Dhanbad.
8. Hydrogeology	Karant, K. R., 1989.	Tata McGraw Hill Publ
9. Groundwater	Raghunath, H. M., 1990.	Wiley Eastern Ltd
10. Water	Subramaniam, V., 2000.	Kingston Publ. London

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**)

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

Fifth Semester

GEOLOGY

Paper: ECONOMIC GEOLOGY AND HYDROGEOLOGY

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicates full marks

SECTION: A

- I.** Answer any FIVE questions 5X2=10 Marks
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.

SECTION: B

- II.** Answer any SIX of the questions 6X5=30 Marks
- 7.
 - 8.
 - 9.
 - 10.
 - 11.
 - 12.
 - 13.
 - 14.

SECTION: C

- III.** Answer any FOUR questions 4X10=40 Marks
- 15.
 - 16.
 - 17.
 - 18.
 - 19.
 - 20.

PRACTICAL MODEL PAPER
B.Sc Degree Practical Examination
Fifth Semester
GEOLOGY
Paper: ECONOMIC GEOLOGY AND HYDROGEOLOGY

Credits: 1

Time: 03 Hours

Max.Marks:40

1. Identify the given economic minerals from 1 to 5 and write their physical properties, chemical composition, origin, occurrences and distribution in India and uses. **10 Marks**
2. Identify the given economic minerals from 7 to 8 and write their diagnostic properties. **05 Marks**
3. Find out the pH and Electrical conductivity of the given water sample. **05 Marks**
4. Graphical representation of chemical quality data and water classification by C-S and Trilinear diagrams. **10 Marks**
5. Lab Record and Viva-voce **10 Marks.**

5th SEMESTER

Discipline Specific Elective (DSE) under CBCS

Title of the Course: Paper II- Introduction to Geophysics

Course Code: (DSE) GLG-SET-(E)-556-P-II

(Candidate shall choose either Paper-I or Paper-II)

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit 1: Geology and Geophysics

1. Interrelationship between geology and geophysics, Role of geological and geophysical data in explaining geodynamical features of the earth.

Unit 2: General and Exploration geophysics

2. Different types of geophysical methods - gravity, magnetic, electrical and seismic; their principles and applications. Concepts and Usage of corrections in geophysical data

Unit 3: Geophysical field operations

3. Different types of surveys, grid and route surveys, profiling and sounding techniques. Scales of survey, Presentation of geophysical data

Unit 4: Application of Geophysical methods

4. Regional geophysics, oil and gas geophysics, ore geophysics, groundwater geophysics, engineering geophysics

Unit 5: Geophysical anomalies

5. Correction to measured quantities, geophysical, anomaly, regional and residual (local) anomalies, factors controlling anomaly, and depth of exploration

Unit 6: Integrated geophysical methods

6. Ambiguities in geophysical interpretation, planning and execution of geophysical surveys

PRACTICALS

(DSE) GLG-SEP-(E)-556-P-II [Marks 40 + 10 = 50]

1. Anomaly and background- Graphical method
2. Study and interpretation of seismic reflector geometry
3. Problems on gravity anomaly

Books Recommended

Name of the Book	Author	Publisher
1. Outlines of Geophysical Prospecting - A manual for geologists by	Ramachandra Rao, M.B.	Prasaranga, University of Mysore, Mysore, 1975.
2. Exploration Geophysics - An Outline	Bhimasarikaram V.L.S.	Association of Exploration Geophysicists, Osmania University, Hyderabad
3. An introduction to Geophysical Prospecting	Dobrin, M.B. (1984)	McGraw-Hill, New Delhi
4. Applied geophysics (Vol. 1).	Telford, W. M., Geldart, L. P., & Sheriff, R. E. (1990).	Cambridge university press
5. Fundamentals of geophysics.	Lowrie, W. (2007)	Cambridge University Press

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**)

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

Fifth Semester

GEOLOGY

Paper: GEOPHYSICS Paper-II

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 1) All questions are compulsory.
- 2) Draw neat labelled diagrams wherever necessary.
- 3) Figures to the right indicates full marks

SECTION: A

- I.** Answer any FIVE questions 5X2=10 Marks
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.

SECTION: B

- II.** Answer any SIX of the questions 6X5=30 Marks
- 7.
 - 8.
 - 9.
 - 10.
 - 11.
 - 12.
 - 13.
 - 14.

SECTION: C

- III.** Answer any FOUR questions 4X10=40 Marks
- 15.
 - 16.
 - 17.
 - 18.
 - 19.
 - 20.

PRACTICAL MODEL PAPER
B.Sc Degree Practical Examination
Fifth Semester
GEOLOGY
Paper: GEOPHYSICS Paper-II

Credits: 1

Time: 03 Hours

Max.Marks:40

1. Anomaly and background- Graphical method **10 Marks**
2. Study and interpretation of seismic reflector geometry **10 Marks**
3. Problems on gravity anomaly **10 Marks**
4. Lab Record and Viva-voce **10 Marks.**

6th SEMESTER

Discipline Specific Elective (DSE) under CBCS

Title of the Course: Paper I- Elements of Applied Geology

Course Code: (DSE) GLG-SET-(F)-556-P-I

(Candidate shall choose either Paper-I or Paper-II)

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit-1: Elements of Applied Geology

1. Soil: Definition, processes of soil formation, engineering properties of rocks and soil, Soil groups of India.
2. Dam: Definition, types of dams, geological and environmental considerations of dams, geological problem of reservoirs.
3. Tunnels: Definition; geological considerations of tunnel, seepage problem and role of water table.
4. Landslides: definition and classification of landslides; its causes and mitigation.
5. Mineral exploration: Elementary idea of geological, geophysical and geochemical prospecting.
6. Concept of Mining, types of mining, impact of mining on environment.

PRACTICAL
(DSE) GLG-SEP-(F)-556-P-I [Marks 40 + 10 = 50]

Unit-1: Elements of Applied Geology

1. Surveying by plane table/ prismatic compass/ Theodolite.
2. Preparation of engineering geological maps, engineering properties and identification of building stones.
3. Identification of various types of landslide and dams from given representative models/ figures/ photographs.
4. Study of soil profiles.

Books Recommended

Name of the Book	Author	Publisher
1. Environmental Geology	Valdiya, K.S., 1987.	Indian Context. Tata McGraw Hill.
2. Mineral Exploration:Recent Strategies.	Rajendran S., 2007.	
3. Introduction to Geophysical Prospecting,	Dobrin, M.B. & Savit, CH., 1988.	McGraw-Hill.
4. Courses in Mining Geology.	Arogyaswamy, R.N.P., 1973.	Oxford and IBH Publ.
5. Principles of applied geophysics.	Parasins, D.S., 1997.	Chapman Hall.
6. Principles of Engineering Geology & Geotechnics	Krynine D.P. and Judd W.R., 1957.	McGraw-Hill Book
7. A text book of engineering geology	Kesavulu, N.C., 2009.	Macmillan P publishing India Ltd.
8. Landslides: causes, consequences and environment	Crozier. M.J., 1989.	Academic Press.
9. Techniques in Mineral exploration	Readman, J.H., 1979.	Applied Science Publishers
10. Fundamentals of Engineering Geology	Bell,F.G.,1983.	Butterworth and Co

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**)

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

Sixth Semester

GEOLOGY

Paper: ELEMENTS OF APPLIED GEOLOGY Paper-I

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 4) All questions are compulsory.
- 1) Draw neat labelled diagrams wherever necessary.
- 2) Figures to the right indicates full marks

SECTION: A

- I.** Answer any FIVE questions 5X2=10 Marks
- 1.
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.

SECTION: B

- II.** Answer any SIX of the questions 6X5=30 Marks
- 7.
 - 8.
 - 9.
 - 10.
 - 11.
 - 12.
 - 13.
 - 14.

SECTION: C

- III.** Answer any FOUR questions 4X10=40 Marks
- 15.
 - 16.
 - 17.
 - 18.
 - 19.
 - 20.

PRACTICAL MODEL PAPER
B.Sc Degree Practical Examination
Sixth Semester
GEOLOGY
Paper: ELEMENTS OF APPLIED GEOLOGY Paper-I

Credits: 1

Time: 03 Hours

Max.Marks:40

5. Surveying by Plane table/Compass survey. **05 Marks**
6. Determination of the soil texture and report writing. **10 Marks**
7. Identification of various types of landslide and dams from given representative models/ figures/ photographs **05 Marks**
8. Preparation of engineering geological maps, engineering properties and identification of building stones. **10 Marks**
9. Lab Record and Viva-voce **10 Marks.**

6th SEMESTER

Discipline Specific Elective (DSE) under CBCS

Title of the Course: Paper II- Mineral Exploration

Course Code: (DSE) GLG-SET-(F)-556-P-II

(Candidate shall choose either Paper-I or Paper-II)

Credits: 06 Hrs	Theory class 4Hrs/wk	Total Th: 60 Lectures	4Hrs/wk
			Total Pr: 52 Hrs.
Theory: 04	Theory Marks 100	80 Marks (3 Hrs)	20 Marks IA
Practical: 02	Practical Marks 50	40 Marks (3Hrs)	10 Marks IA

Unit 1: Mineral Resources

1. Resource reserve definitions, Mineral resources in industries – historical perspective and present, A brief overview of classification of mineral deposits with respect to processes of formation in relation to exploration strategies.

Unit 2: Prospecting and Exploration,

2. Principles of mineral exploration, Prospecting and exploration- conceptualization, methodology and stages, Sampling, subsurface sampling including pitting, trenching and drilling, geochemical exploration.

Unit 3: Evaluation of data

3. Evaluation of sampling data; Mean, mode, median, standard deviation and variance

Unit 4: Drilling and Logging

4. Core and non-core drilling: Planning of bore holes and location of boreholes on ground. Core-logging

Unit 5: Reserve estimations and Errors

5. Principles of reserve estimation, density and bulk density. Factors affecting reliability of reserve estimation. Reserve estimation based on geometrical models (square, rectangular, triangular and polygon blocks). Regular and irregular grid patterns, statistics and error estimation

PRACTICALS

(DSE) GLG-SET-(F)-556-P-II [Marks 40 + 10 = 50]

1. Identification of anomaly. Concept of weighted average in anomaly detection. Geological cross-section
2. Sample preparation-coning and quartering.
3. Estimation of ore reserves- Bedded type and vein type (Included and Extended area method problems), Models of reserve estimation.

Books Recommended

Name of the Book	Author	Publisher
1. Elements of Mining	Clark, G.B. 1967	3rd Ed. John Wiley & Sons.
2. Courses in Mining Geology	Arogyaswami, R.P.N. 1996	4th Ed. Oxford-IBH.
3. Introduction to Mineral Exploration	Moon, C.J., Whateley, M.K.G., Evans, A.M.,	Blackwell Publishing.

Note for paper setting/Setter:

Internal Assessment test (Total 20 marks; Time duration 1 hour): The internal assessment shall consist of two long answer type question of 05 marks and five short answer type questions of 2 marks each to be conducted after the completion of 50% syllabus. (After 45 days).

Semester End Examination (Total 80 marks; Time duration - 03 hours). The examination is to be conducted after completion of 100% of syllabus. The question paper shall consist of sections **A, B and C**.

Section A will consist of **06** short answer (30-40 words) questions of 02 marks each to be set from all the unit i.e. at least one question from each unit. Any **FIVE** questions are to be attempted by the candidate. (**Total 10 marks**)

Section B will consist of 08 medium answer (150-200 words) questions of 05 marks each to be set from all the units i.e. at least one question from each unit. Any **SIX** questions are to be attempted by the candidate. (**Total 30 marks**)

Section C will consist of 06 long answer (400-500 words) questions of 10 marks each and to be set from entire syllabus. Any **FOUR** questions are to be attempted by the candidate. (**Total 40 marks**)

MODEL QUESTION PAPER FOR THEORY MAIN EXAM

B.Sc Degree Examination

Sixth Semester

GEOLOGY

Paper: MINERAL EXPLORATION Paper-II

Time: 3 Hours

Max. Marks: 80

Instructions to the candidates:

- 1) All questions are compulsory.**
- 2) Draw neat labelled diagrams wherever necessary.**
- 3) Figures to the right indicates full marks**

SECTION: A

I. Answer any FIVE questions **5X2=10 Marks**

- 21.
- 1.
- 2.
- 3.
- 4.
- 5.

SECTION: B

II. Answer any SIX of the questions **6X5=30 Marks**

- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.

SECTION: C

III. Answer any FOUR questions **4X10=40 Marks**

- 14.
- 15.
- 16.
- 17.
- 18.
- 19.

PRACTICAL MODEL PAPER

B.Sc Degree Practical Examination

Sixth Semester

GEOLOGY

Paper: MINERAL EXPLORATION Paper-II

Credits: 1

Time: 03 Hours

Max.Marks:40

1. Sample preparation. **05 Marks**
2. Ore reserve estimation. **20 Marks**
3. Field work: Field visit **05 Marks**
4. Lab Record and Viva-voce **10 Marks.**

SKILL ENHANCEMENT COURSE (SEC)

5th SEMESTER

Title of the Course: Geomorphology and Geo-tectonics

Course Code: (SEC) GLG-SET-512

Total Syllabus: 30 hrs / Sem	2 hrs / Week	Duration of Exam: 1.5 hrs
Examination: Maximum Marks- 50 (40 Semester End exam + 10 IA Exam)		

Unit-1: Geomorphology

20 Marks

1. Basic principles of Geomorphology, Geomorphological cycle, weathering and erosion, Geomorph mapping- tools and techniques.
2. Epigenic and exogenic processes, degradation and aggradation, hypogenic and endogenic processes, diastrophism and volcanism, Geological work of wind, glacier, river, groundwater and ocean.

Unit-2: Geo-tectonics

1. Earth as a dynamic system, Elementary idea of Continental Drift, Sea-floor spreading and mid-oceanic ridges. Palaeomagnetism and its application.
2. Plate Tectonics: The concept, plate margins, orogeny, deep sea trenches, island arcs and volcanic arcs.

Unit-3: Internal Assessment

10 Marks

Books Recommended

Name	Author	Publisher
1. Earth Surface Processes.	Allen, P., 1997.	Blackwell
2. Geomorphology: A systematic Analysis of Late Cenozoic Landforms (3rd Edition).	Bloom, A.L., 1998.	Pearson Education, Inc.
3. Global Tectonics. Blackwell and crustal evolution.	Keary, P. and Vine, F.J., 1997.	Butterworth-Heinemann.
4. Introduction to Geomorphology.	Kale, V.S. and Gupta, A., 2001.	Orient Longman Ltd.
5. Tectonics.	Moore, E and Twiss. R.J., 1995.	Freeman
6. The Dynamic Earth System.	Patwardhan, A. M., 1999.	Prentice Hall.
7. Geomorphology and Global tectonic.	Summerfield, M.A., 2000.	Springer Verlag
8. Dynamic Himalaya.	Valdia, K.S., 1988.	Universities Press, Hyderabad.
9. Principles of Geomorphology..	WD Thornbury, 2002.	CBS Publ. New Delhi

5th SEMESTER

SKILL ENHANCEMENT COURSE (SEC)

Title of the Course: **Environmental Geology**

Course Code: (SEC) GLG-SET-522

Total Syllabus: 30 hrs / Sem	2 hrs / Week	Duration of Exam: 1.5 hrs
Examination: Maximum Marks- 50 (40 Semester End exam + 10 IA Exam)		

Unit-1: Environmental Geology

20 Marks

1. Earth and its spheres: Atmosphere, Hydrosphere, Lithosphere, Biosphere and Man; Earth Material.
2. Energy Budget: Solar Radiation; Global environments: Coastal, temperate, desertic, tropical, cold, and polar; Concept of global warming and climate change.
3. Geological hazards: Earthquakes, Volcanism, Landslides, Avalanches, Floods, Droughts; Hazard mitigation.
4. Resource management: Energy resources (conventional and non-conventional), watershed management, land use planning, management of water resources, land reclamation.

Unit-2: Internal Assessment

10 Marks

Books Recommended

Name	Author	Publisher
1. Geomorphology Earth surface processes and form.	Verma, V.K., 1986.	McGraw Hill.
2. Geomorphology..	Chorley, R. J., 1984.	Methuen
3. Earths Changing Surface.	Selby, M.J., 1996.	Oxford University Press UK.
4. Principles of Geomorphology	Thorn Bury W. D., 1997.	Wiley Eastern Ltd., New Delhi.
5. Environmental Geology - Indian Context.	Valdiya, K. S., 1987.	Tata McGraw Hill New Delhi.
6. Environmental Geology.	Keller, E. A., 2000.	Shales E. Merrill Publishing Co., Columbus, Ohio.
7. Environmental Geology	Montgomery, C., 1984.	John Wiley and Sons, London.
8. Coastal Geomorphology: An Introduction..	Bird, Eric, 2000.	John Wiley & Sons, Ltd. Singapore
9. Earthquake Risk and Damage,	Liu, B.C., 1981.	West View.

6th SEMESTER

SKILL ENHANCEMENT COURSE (SEC)

Title of the Course: **Geochemistry**
Course Code: (SEC) GLG-SET-632

Total Syllabus:30 hrs / Sem	2 hrs / Week	Duration of Exam: 1.5 hrs
Examination: Maximum Marks- 50 (40 Semester End exam + 10 IA Exam)		

Unit-1: Geochemistry

20 Marks

1. Introduction to Geochemistry, Basic knowledge about crystal chemistry, types of chemical bonds, co-ordination number, and elementary idea of periodic table.
2. Cosmic abundance of elements; composition of the planets and meteorites, geochemical evolution of the earth and geochemical cycles.
3. Goldschmidt's geochemical classification of elements, distribution of major, minor and trace elements in igneous, metamorphic and sedimentary rocks.
4. Elements of geochemical thermodynamics; isomorphism and polymorphism; isotope geology.

Unit-2: Internal Assessment

10 Marks

Books Recommended

Name	Author	Publisher
1. Stable Isotope Geochemistry.	Hoefs, J., 1980.	Springer-Verlag.
2. Manual of Mineralogy.	Klein, C. and Hurlbut, C.S., 1993.	John Wiley and Sons, New York.
3. Introduction to Geochemistry.	Krauskopf, K.B., 1967	McGraw Hill.
4. Introduction to Geochemistry.	Mason, B. and Moore, C.B., 1991.	Wiley Eastern.
5. Using geochemical data: Evaluation, Presentation, and Interpretation.	Rollinson, H.R., 1993	Longman.

6th SEMESTER

SKILL ENHANCEMENT COURSE (SEC)

Title of the Course: **Photogeology and Remote Sensing**

Course Code: (SEC) GLG-SET-642

Total Syllabus 30 hrs / Sem	2 hrs / Week	Duration of Exam: 1.5 hrs
Examination: Maximum Marks- 50 (40 Semester End exam + 10 IA Exam)		

Unit-1: Photo-Geology and Remote Sensing

20 Marks

1. Elementary idea about photo-geology, aerial photographs and satellite images; types and geometry of aerial photographs; factors effecting aerial photographs; types of camera, film and filters, factors effecting photographic scale.

Unit-2: Remote Sensing

2. Fundamentals of Remote Sensing; Introduction, Electromagnetic Remote Sensing Process, Nature of Electromagnetic Radiation and Spectrum, Energy Source and its Characteristics, Atmospheric Interactions with Electromagnetic Radiation, Remote Sensing Platforms and Sensors.
3. Spectral Signature of rocks, minerals and soils; Application of Remote Sensing in Geo- sciences and geomorphological studies.
4. Types of Indian and Foreign Remote Sensing Satellites. Digital image processing; Fundamental steps in image processing; elements of pattern recognition and image classification.
5. Introduction to GIS, components of GIS, product generation in GIS, tools for map analysis; integration of GIS with remote sensing.

Unit-3: Internal Assessment

10 Marks

Books Recommended

Name	Author	Publisher
1. Remote Sensing and GIS.	Bhatta, B., 2008.	Oxford, New Delhi.
2. Remote Sensing Geology.	Gupta, R.P., 1990.	Springer Verlag.
3. Remote Sensing and Image Interpretation.	Lilleasand, T.M. and Kiffer, R.W., 1987.	John Wiley.
4. Principles and Application of Photogeology..	Pandey, S.N., 1987.	Wiley Eastern, New Delhi
5. Remote Sensing – Principles and Applications.	Sabbins, F.F., 1985.	Freeman.
6. Remote Sensing in Geology.	Siegal, B.S. and Gillespie, A.R., 1980.	John Wiley.
7. Hand book of aerial photography and interpretation.	Rampal K.K. 1999.	Concept publication.

GENERAL PATTERN OF THEORY QUESTION PAPER FOR ALL SEC

1. Question number 1-6 carries 2marks to answer any 5 questions : 10 marks
2. Question number 7-12 carries 5marks to answer any 4 questions : 20 marks
3. Question number 13-14 carries 10marks to answer any 1 questions : 10marks

Total: 40 marks
