DEPARTMENT OF GEOLOGY

COURSE CURRICULUM & MARKING SCHEME

M.Sc. GEOLOGY

Semester - I

SESSION : 2023-24

ESTD: 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A+, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

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DEPARTMENT OF GEOLOGY
GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG (C.G.)
M.Sc. Geology 2023-24

M.Sc. geology programme renders insight on the Earth Systems Sciences and its relationship with other branches of science leading to development of basic observational skill to become prominent geoscientist. Students will develop their critical thinking skills, application to solve the geological problems using scientific methods. Training under this program will enhance the ability of the students to acquire, analyze and communicate their ideas, scientific data and interpretation to the users. The programme equips them for competing in different national level examinations.

Approved syllabus for M.Sc. Geology by the members of Board of Studies for the Sessions 2023-24 and 2024-25, the syllabus with the paper combinations is as under

Semester I:

Paper I : Geomorphology **Course code:- MGL 101**	**Paper II :** Structural Geology and Tectonics **Course code:- MGL 102**
Paper III: Mineralogy and Crystallography **Course code:- MGL 103**	**Paper IV:** Geochemistry, Instrumentation and Analytical Techniques **Course code:- MGL 104**
Practical: Lab Course I **Course code:- MGLP01**	**Practical: Lab Course II** **Course code:- MGLP02**

Semester II:

Paper I: Igneous Petrology **Course code:- MGL 201**	**Paper II:** Sedimentology **Course code:- MGL 202**
Paper III: Metamorphic Petrology **Course code:- MGL 203**	**Paper IV:** Palaeobiology and Stratigraphy **Course code:- MGL 204**
Practical: Lab Course I **Course code:- MGLP03**	**Practical: Lab Course II** **Course code:- MGLP04**
Field work/Report + viva - 100 **Course code:- MGLP05**	

Semester III:

Paper I: Environmental Geology **Course code:- MGL 301**	**Paper II:** Economic Geology **Course code:- MGL 302**
Paper III: Mineral Exploration **Course code:- MGL 303**	**Paper IV:** Hydrogeology **Course code:- MGL 304**

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Practical: Lab Course I **Course code:- MGLP06**	**Practical: Lab Course II** **Course code:- MGLP07**

Semester IV:

Paper I: Photogeology and Remote Sensing **Course code:- MGL 401**	**Paper II:** Engineering Geology and Mineral Beneficiation **Course code:- MGL 402**
Paper III: Mineral Resource Development and Mining Geology **Course code:- MGL 403**	**Paper IV:** Energy Resources **Course code:- MGL 404** **OR** **Field Work/ Project work (In lieu of one theory paper)**
Practical: Lab Course I **Course code:- MGLP08**	**Practical: Lab Course I** **Course code:- MGLP09**

*** Field Work/ Project work (In lieu of theory papers) –**

{Project oriented Dissertation - 50 marks +Viva on Dissertation - 50 marks} Total 100 Marks

The syllabus for M.Sc. Geology is hereby approved for the sessions 2023-24 and 2024 -25.

Program Outcomes of M.Sc. Geology

PO1: Knowledge: Acquire an overview of concepts, fundamentals and advancements of science across a range of fields, with in-depth knowledge in at least one area of study. Develop focused field knowledge and amalgamate knowledge across different disciplines.

PO2: Complementary skills: Students will be able to engage in critical investigation through principal approaches or methods and through effective information search and employ highly developed conceptual, analytical, quantitative and technical skills and are adept with a range of technologies

PO3: Applied learning: Students will be able to apply disciplinary or interdisciplinary learning across multiple contexts, integrating knowledge and practice. Recognize the need for information; effectively search for, evaluate, manage and apply that information in support of scientific investigation or scholarly debate

PO4: Communication: Communicate effectively on scientific achievements, basic concepts and recent developments with experts and with society at large. Able to comprehend and write reports, documents, make effective presentation by oral and/or written form.

PO5: Problem solving: Investigate, design and apply appropriate methods to solve problems in science, mathematics, technology and/or engineering.

PO6: Environment and sustainability: Understand the impact of the solutions in ethical, societal and environmental contexts and demonstrate the knowledge of and need for sustainable development.

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PO7: Teamwork, collaborative and management skills: Recognize the opportunities and contribute positively in collaborative scientific work. Engage in intellectual exchange of ideas with other disciplines.

Program Specific Outcomes of M.Sc. Geology

The student graduating with the M.Sc. Geology will be able to

1. Acquire fundamental/systematic or coherent understanding of the academic field of Geology, its different learning areas
2. Demonstrate the ability to use skills in Geology and its related areas of technology for formulating and tackling geosciences-related problems and identifying and applying appropriate geological principles and methodologies to solve a wide range of problems associated with geosciences.
3. Demonstrate competencies related to problem-solving skills that are required to solve different types of geosciences-related problems and investigative skills, including skills of independent investigation of geosciences-related issues and problems;
4. Develop Communication skills and analytical skills ability to work both independently and in Teams involving the ability to read texts and research papers analytically and to present information in a concise manner

Syllabus and Marking Scheme for First Semester

Paper No.	Title of the Paper	Marks Allotted in Theory		Marks Allotted in Internal Assessment		Credits
		Max	Min	Max.	Min.	
I	Geomorphology	80	16	20	04	05
II	Structural Geology and Tectonics	80	16	20	04	05
III	Mineralogy and Crystallography	80	16	20	04	05
IV	Geochemistry, Instrumentation and Analytical Techniques	80	16	20	04	05
V	Lab Course I	100	33			04
IV	Lab Course II	100	33			04
	Total	**520**		**80**		**28**

04 Theory papers - 320
04 Internal Assessments - 80
02 Practical - 200
Total Marks - 600

Note: 20 marks = 01 credit in Theory Papers and 25 Marks = 01 Credit in Practical/Project work.

GENERAL INSTRUCTIONS FOR STUDENTS

1. The candidate has to obtain minimum 20% marks in each theory paper and internal assessment separately.
2. The candidate has to secure minimum 36% marks as an aggregate in order to pass that semester examination.
3. The internal assessment shall include class test, home assignment and seminar presentation.

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Course Outcome Paper I: Geomorphology

On completion of Course, the students will be able to

1. Describe the fundamental concepts of Geomorphology, Weathering, Soil processes and Geomorphic regions of India, Coastal landforms.
2. Identify and describe the landforms formed by the volcanoes, tectonic activities and the geological work done by a river and Karst Topography.
3. Describe the geological work done by the wind and glacial processes
4. Analyze the drainage patterns using morphometric analysis and apply the principles of geomorphology in various domains.

DETAILS OF SYLLABUS

FIRST SEMESTER

Course Code:- MGL 101, Paper I: Geomorphology

Max. Marks 80 **Min. Marks 16**

Unit 1. (i) Concepts of Geomorphology, weathering processes, cycle of erosion.
(ii) Landforms in relation to climate, rock type, structure & tectonics.
(iii) Geomorphic regions of India. Rock weathering and soil formation.
(iv) Hypsography of the continents and ocean floor- Continental shelf, slope, rise and abyssal plains.
(v) Coastal landforms.

Unit 2. (i) Fluvial landforms: Erosional and depositional landforms formed due to fluvial action
(ii) Karst landforms. Erosional landforms formed due to the action of underground water
(iii) Karst landforms. Depositional landforms formed due to the action of underground water
(iv) Volcanoes- Their form & structure, Types, Volcanic products
(v) Volcanic landforms, volcanic belts of the world.

Unit 3. (i) Aeolian landforms: Erosional landforms formed due to the action of wind.
(ii) Aeolian landforms: Depositional landforms formed due to the action of wind.
(iii) Glacial landforms Erosional landforms formed due to glacial action
(iv) Glacial landforms: Depositional landforms formed due to glacial action
(v) Ice Age and its causes

Unit 4. (i) Morphometric Analysis, slope analysis, stream ordering, Bifurcation ratio, stream frequency, drainage density.
(ii) Applied Geomorphology meaning and concept.
(iii) Geomorphology and hazard management.
(iv) Geomorphology and engineering works.
(v) Geomorphology and mineral exploration.

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FIRST SEMESTER
Paper I: Geomorphology

Books Recommended

Thornbury, W.D., 1986: Principles of Geomorphology. John Wiley.
Singh, Savindra, 2007: Geomorphology. Prayag Pustak Bhavan, Allahabad.

Question Paper Format and Distribution of Marks for PG Semester Examination

Question paper format for the Post-Graduate Examination has been revised from the Session 2018-19. The revised format will be applicable for all the question papers of Semester I, II, III & IV. The following are the main points of the new format:

1. The question paper will be of **80 marks** (as before)
2. Questions will be asked Unit-wise in each question paper.
3. From each Unit, the questions will be asked as follows:
   - Q.1 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**
   - Q.2 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**
   - Q.3 Short answer type question **(Answer in 200-250 words)** **(04 Marks)**
   - Q.4 Long answer type questions **(Answer in 400-450 words)** **(12 Marks)**

Type of Question	Unit-I	Unit-II	Unit-III	Unit-IV
Very Short (2 Questions) (Maximum two sentences)	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks
Short (1 Question) 200-250 words	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks
Long answer (1 Question) 400-450 words	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks

Note:

1. Question no. 1 and Question 2 will be compulsory.
2. Question no. 3 and 4 will consist of 2 optional questions of which one has to be attempted.
3. As mentioned above, two compulsory very short answer type questions (2+2 marks), one short answer type question with internal choice (4 marks) and one long answer typequestion with internal

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choice (12 marks) will be asked from each unit. Thus there will be questions of 20 marks from each unit and of total 80 marks from all the four units of the Syllabus/syllabi.

4.Internal Assessment Examination will be as follows:

i. Internal Test in each paper (20 marks)
ii. Seminar (Power point presentation) in any one of the paper (20 marks)
iii. Assignment in each of the remaining papers (excluding the paper of Seminar. (20 marks)
iv. Average of marks obtained in internal test + seminar in any one paper and marks obtained in internal test + assignment in rest of the papers will be calculated and taken into consideration.

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Course Outcome Paper II: Structural Geology and Tectonics

On completion of Course, the students will be able to

1. Understand and assess stress acting on a rock during deformation. Identify, classify and compare various types of folds
2. Classify and describe faults, joints and unconformities and conclude about the mechanics of their formation.
3. Demonstrate the ability to judge the order of superposition of rock beds. Identify, classify, interpret and compare planer and linear fabric in rocks. Construct and interpret geological maps and π and β diagrams
4. Summarize the theory of plate tectonics and explain the evolution of continental and oceanic crust and anatomy of Precambrian orogenic belts of India.

FIRST SEMESTER
Paper II: Structural Geology and Tectonics

Max. Marks 80 **Min. Marks 16**

Unit 1. (i) Mechanical principles of rocks and their controlling factors. Concept of stress and strain and theory of rock failure. Role of fluids in deformation processes.
(ii) Stress analysis: Compressive and shear stress, biaxial and triaxial stress, Mohr's circle and envelope. Two-dimensional stress and strain analyses. Types of stress and strain ellipsoids, their properties and geological significance.
(iii) Folds, their description and classification. Causes and mechanics of folding and buckling.
(iv) Fold development and distribution of strains in folds.

Unit 2. (i) Fractures and joints, their nomenclature, classification, origin and significance.
(ii) Elements, terminology and classification of faults.
(iii) Causes and mechanics of faulting. Strike slip fault, normal fault, over thrust and nappe structure.
(iv) Unconformities, types and significance.

Unit 3. (i) Top and bottom criteria using primary and secondary structures.
(ii) Planar and linear fabrics in deformed rock, their origin and significance.
(iii) Field techniques of lithological and structural mapping.
(iv) Significance and limitations of π and β diagrams.

Unit 4. (i) Concept of plate tectonics and recent advances.
(ii) Dynamic evolution of continental and oceanic crust.
(iii)Tectonics of precambrian orogenic belts of India.
(iv) Formation of mountain roots and Anatomy of orogenic belts.

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Books Recommended

Ramsay, J.G., 1967: Folding and Fracturing of Rocks. McGraw Hill.

Hobbs, B.E., Means, W.D. and Williams, P.F., 1976: An Outline of Structural Geology, John Wiley.

Davis, G.R., 1984: Structural Geology of Rocks and Region. John Wiley.

Ramsay, J.G. and Huber, M.I., 1987: Modern Structural Geology, Vol. I and II Academic Press.

Ghosh , S.K.,1995: Structural Geology Fundamentals of Modern Developments. Pergamon Press.

Billings, M.P., Structural Geology

Moores, E. and Twiss, R.J., 1995: Tectonics. Freeman.

Valdiya, K.S.,1998: Dynamic Himalaya. Universities Press, Hyderabad.

Summerfield, M.A., 2000: Geomorphology and Global Tectonics. Springer Verlag.

Question Paper Format and Distribution of Marks for PG Semester Examination

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1. The question paper will be of **80 marks** (as before)
2. Questions will be asked Unit-wise in each question paper.
3. From each Unit, the questions will be asked as follows :

Q.1 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**

Q.2 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**

Q.3 Short answer type question **(Answer in 200-250 words)** **(04 Marks)**

Q.4 Long answer type questions **(Answer in 400-450 words)** **(12 Marks)**

Type of Question	Unit-I	Unit-II	Unit-III	Unit-IV
Very Short (2 Questions) (Maximum two sentences)	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks
Short (1 Question) 200-250 words	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks
Long answer (1 Question) 400-450 words	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks

Note :- 1. Question no. 1 and Question 2 will be compulsory.

2. Question no. 3 and 4 will consist of 2 optional questions of which one has to be attempted.
3. As mentioned above, two compulsory very short answer type questions (2+2 marks), one short answer type question with internal choice (4 marks) and one long answer type question with internal choice (12 marks) will be asked from each unit.
   Thus there will be questions of 20 marks from each unit and of total 80 marks from all the four units of the syllabus/syllabi.
4. Internal Assessment Examination will be as follows :

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i. Internal Test in each paper (20 marks)
ii. Seminar (Power point presentation) in any one of the paper (20 marks)
iii. Assignment in each of the remaining papers (excluding the paper of Seminar. (20 marks)
iv. Average of marks obtained in internal test + seminar in any one paper and marks obtained in internal test + assignment in rest of the papers will be calculated and taken into consideration.

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Course Outcome Paper III: Mineralogy and Crystallography

At the end of the course, the students will be able to

1. Identify and classify the rock-forming minerals on the basis of their physical and optical properties and discuss the construction and working of Quartz wedge, Gypsum plate and Mica plate.
2. Determine the optical characters, order of interference color and pleochroic scheme of minerals
3. Discuss the symmetry characteristics and forms of various crystal systems
4. Categorize and describe the properties of rock forming silicates and gemstones

FIRST SEMESTER
Paper- III Mineralogy and Crystallography

Max. Marks 80 **Min. Marks 16**

Unit 1.
(i) Minerals and their classification
(ii) Physical and optical properties of minerals
(iii) Refractrometry and its determination. Uniaxial and Biaxial indicatrics.
(iv) Dispersion in minerals, optic orientation, optical anomalies.
(v) Optical accessories: Quartz wedge, Gypsum plate and Mica plate

Unit 2.
(i) Determination of order of interfenece colour and pleochroic scheme of minerals
(ii) Optical characters of Uniaxial and Biaxial minerals
(iii) Morphology of crystals. Fundamental laws of crystal Zones and Zonal symbols.
(iv) Classification of crystals in 32 classes.
(v) Symmetry and forms of crystals of Isometric, Tetragonal, Hexagonal systems

Unit 3.
(i) Symmetry and forms of crystals of orthorhombic , monoclinic and triclinic systems.
(ii) Crystal aggregates- Twinning. Irregularities and imperfection in crystals.
(iii) Classification of silicate structure
(iv) Systematic mineralogy (atomic structure, mineral chemistry and their P-T stability and mode of occurrence of Nesosilicates – Olivine, Garnet.
(v) Systematic mineralogy of Soro silicates- Epidote, Zircon, Topaz Staurolite and Sphene.

Unit 4.
(i) Systematic mineralogy of Cyclosilicates – Cordierite, Tourmaline and Beryl.
(ii) Systematic mineralogy of Inosilicates – Pyroxene and Amphibole groups.
(iii) Systematic mineralogy of Phyllosilicates – Mica, Chlorite, Serpentine, Clay minerals, Kaolinite and Talc.
(iv) Systematic mineralogy of Tectosilicates- Silica, Felspar, Feldspathoids and Zeolite groups
(v) Gems and Semiprecious stones.

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FIRST SEMESTER
Paper- III Mineralogy and Crystallography

Books Recommended

Deer, W.A., Howie, R.A., and Zussman, J., 1996: The Rock Forming Minerals. Longman.

Klein and Hurlbut, Jr., C.S., 1993: Manual of Mineralogy. John Wiley.

Phillips, W.R. and Griffen, D.T., 1986: Optical Mineralogy. CBS Edition.

Perkins, D. 2002: Mineralogy. Prentice Hall.

Nesse, W.D., 2000: Introduction to Mineralogy. Oxford University Press.

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1. The question paper will be of **80 marks** (as before)
2. Questions will be asked Unit-wise in each question paper.
3. From each Unit, the questions will be asked as follows:

Q.1 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**

Q.2 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**

Q.3 Short answer type question **(Answer in 200-250 words)** **(04 Marks)**

Q.4 Long answer type questions **(Answer in 400-450 words)** **(12 Marks)**

Type of Question	Unit-I	Unit-II	Unit-III	Unit-IV
Very Short (2 Questions) (Maximum two sentences)	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks
Short (1 Question) 200-250 words	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks
Long answer (1 Question) 400-450 words	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks

Note:

1. Question no. 1 and Question 2 will be compulsory.
2. Question no. 3 and 4 will consist of 2 optional questions of which one has to be attempted.

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3. As mentioned above, two compulsory very short answer type questions (2+2 marks), one short answer type question with internal choice (4 marks) and one long answer type question with internal choice (12 marks) will be asked from each unit.

Thus there will be questions of 20 marks from each unit and of total 80 marks from all the four units of the syllabus/syllabi.

5. Internal Assessment Examination will be as follows :
   i. Internal Test in each paper (20 marks)
   ii. Seminar (Power point presentation) in any one of the paper (20 marks)
   iii. Assignment in each of the remaining papers (excluding the paper of Seminar. (20 marks)
   iii. Average of marks obtained in internal test + seminar in any one paper and marks obtained in internal test + assignment in rest of the papers will be calculated and taken into consideration.

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Course Outcome Paper IV: Geochemistry, Instrumentation and Analytical Techniques

At the end of the course, the students will be able to

1. Understand about the chemical differentiation of solar system and the earth,
2. Formulate the radioactive decay schemes and their application in radiometric dating, recall laws of Thermodynamics and geochemistry of oceanic crust, continental crust and island arcs.
3. Explain element partitioning in minerals and rocks and its use in P-T Estimation; Understand elemental mobility in Geochemical cycle and Bio geochemical cycle.
4. Describe instrumentation and analytical techniques used in geochemical analysis.

FIRST SEMESTER

Paper- IV: Geochemistry, Instrumentation and Analytical Techniques

Max. Marks 80 **Min. Marks 16**

Unit 1.
(i) Origin and abundance of elements in solar system and in the earth and its constituents.
(ii) Special properties of transition and rare earth elements.
(iii) Geochemical classification of elements.
(iv) Principles of ionic substitution in minerals. Isomorphism, polymorphism and pseudomorphism
(v) Radiogenic isotopes, Stable isotopes: nature, abundance and fractionation

Unit 2.
(i) Radioactive decay schemes of U-Pb, Sm-Nd, Rb-Sr, K-Ar and growth of daughter isotopes.
(ii) Radiometric dating of single minerals and whole rocks.
(iii) Laws of Thermodynamics: Concepts of free energy, fugacity and equilibrium constant.
(iv) Geochemistry of oceanic crust. Composition of continental crust.
(v) Geochemistry of island arcs.

Unit 3.
(i) Element partitioning in minerals. Element partitioning in rocks.
(ii) Concept of simple distribution coefficients.
(iii)Element partitioning in mineral assemblages and its use in P-T Estimation
(iv) Elemental mobility in surface environment Mineral stability in Eh-pH diagram.
(v) Geochemical cycle. Bio geochemical cycle.

Unit 4.
(i) X-ray Diffractrometry, X-ray Fluorescence spectrometry
(ii) Scanning and Transmission, electron microprobe analysis.
(iii) Thermal ionization and gas source mass spectrometry.
(iv) Principles and application of AAS. Principles and application of cathodo-luminiscence, thermoluminiscence
(v) Sampling and sample preparations. Sample etching, staining and modal count techniques. Techniques of photomicrography.

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Books Recommended

Mason B. and Moore, C.B., 1991: Introduction to Geochemistry. Wiley Eastern.
Krauskopf, K.B., 1967: Introduction to Geochemistry. McGraw Hill.
Henderson, P. 1987: Inorganic Geochemistry. Pergamon Press.
Faure, G.,:1986: Principles of Isotope Geology. John Wiley.

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3. From each Unit, the questions will be asked as follows :

Q.1 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**
Q.2 Very short answer type question **(Answer in one or two sentences)** **(02 Marks)**
Q.3 Short answer type question **(Answer in 200-250 words)** **(04 Marks)**
Q.4 Long answer type questions **(Answer in 400-450 words)** **(12 Marks)**

Type of Question	Unit-I	Unit-II	Unit-III	Unit-IV
Very Short (2 Questions) (Maximum two sentences)	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks	2 x 2 = 4 Marks
Short (1 Question) 200-250 words	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks	1 x 4 = 4 Marks
Long answer (1 Question) 400-450 words	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks	1 x 12 = 12 Marks

Note:

1. Question no. 1 and Question 2 will be compulsory.
2. Question no. 3 and 4 will consist of 2 optional questions of which one has to be attempted.
3. As mentioned above, two compulsory very short answer type questions (2+2 marks), one short answer type question with internal choice (4 marks) and one long answer type question with internal choice (12 marks) will be asked from each unit.

   Thus there will be questions of 20 marks from each unit and of total 80 marks from all the four units of the syllabus/syllabi.
4. Internal Assessment Examination will be as follows :
   i. Internal Test in each paper (20 marks)
   ii. Seminar (Power point presentation) in any one of the paper (20 marks)
   iii. Assignment in each of the remaining papers (excluding the paper of Seminar. (20 marks)

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iv. Average of marks obtained in internal test + seminar in any one paper and marks obtained in internal test + assignment in rest of the papers will be calculated and taken into consideration.

Course Outcome Lab Course - I

At the end of the course, the students will be able to

1. Identify various landforms.
2. Distinguish various types of drainage patterns
3. Do calculations of Morphometric analysis.
4. Demonstrate the skill of preparation of geological cross sections and interpretations of geological maps, Completion of outcrops.
5. Solve structural problems with the help of stereographic projections.
6. Identify structures present in natural rock specimens and models.

FIRST SEMESTER
PRACTICALS

LAB COURSE - I

1. Study of various models of landforms.
2. Morphometric analysis.
3. Study of various types of drainage patterns
4. Preparation and Interpretations of geological maps and sections.
5. Completion of outcrops.
6. Solution of structural problems with the help of stereographic projections.
7. Plotting and interpretation of petro fabric data and resultant diagrams.
8. Study of structures present in natural rock specimens and wooden models.

Course Outcome Lab Course - II

At the end of the course, the students will be able to

1. Identify rock forming minerals in hand specimen and thin section
2. Determine pleochroic scheme in minerals,
3. Estimate Anorthite content in plagioclase,
4. Determine order of interference colour in common minerals.
5. Interpret of results of water analysis with the help of various diagrams.

LAB COURSE - II

1. Megascopic and microscopic study of rock forming minerals.
2. Preparation of thin sections and polished section of minerals.
3. Determination of pleochroic scheme in minerals, Anorthite content in plagioclase.
4. Estimation of birefringence, determination of order of interference colors and sign of elongation in common minerals.
5. Study of interference figure and determination of optic sign.
6. Interpretation of results of water analysis with the help of various diagrams.

Chairperson /H.O.D | Subject Expert | Subject Expert | Subject Expert

Senior Professor of Science Faculty | Departmental members | Alumnus | Student

7. Soil Analysis and its interpretation.
8. Study of crystal models of various crystal systems.
9. Numerical based on radioactive age dating.

Chairperson /H.O.D

Subject Expert

Subject Expert

Subject Expert

Senior Professor of Science Faculty

Departmental members

Alumnus

Student