

SCHEME C-1

**M.Sc. ONE YEAR
SUBJECT: GEOLOGY
PROGRAM: One Year PG
(English)**

BOARD OF STUDIES IN GEOLOGY

For 1-Year PG Programme

Scheme C-1 (For Courses of Science & Arts Discipline having Major Practicum Component)

Year / Semester		Courses Level	Core Courses / Dissertation	Practicum Courses	Internship/Apprenticeship / Seminar OR VAC (CHM/EESC)	Total Credits
First Year	Sem-I	500	CC-31 (6 Credits)	PC-31 (4 Credits)	Internship/Apprenticeship OR Seminar (2 Credits)	22
		500	CC-32 (6 Credits)	PC-32 (4 Credits)		
	Sem-II	500	CC-41 (6 Credits)	PC-41 (4 Credits)	VAC (CHM/EESC) (2 Credits)	22
		500	CC-42 (6 Credits)	PC-42 (4 Credits)		
OPTION-2: Course Work & Research Work (Applicable to the UTDs/Colleges having research centers recognized by the University)						
Year / Semester		Courses Level	Core Courses / Dissertation	Practicum Courses	Seminar / Research thesis/Project/Patent	Total Credits
First Year	Sem-I	500	CC-31 (6 Credits)	PC-31 (4 Credits)	Seminar (2 Credits)	22
		500	CC-32 (6 Credits)	PC-32 (4 Credits)		
	Sem-II	-	-	-	Research thesis / Project / Patent (22 Credits)	22
OPTION-3: Only Research Work (Applicable to the UTDs/Colleges having research centers recognized by the University)						
First Year	Sem-I	Research thesis / Research Project / Patent (22 Credits)				22
	Sem-II	Research thesis / Research Project / Patent (22 Credits)				22

Note: (1) UTDs/Colleges with Research Centers have the choice of running all the OPTIONS mentioned above.

(2) Students having 4-Year Under Graduate Degree (Honours / Honours with Research) are eligible for entry in the Semester-I of 1-Year PG Programme.

Theory Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: ONE Year PG Program	Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
Subject: Geology			
1	Course Code	CC31	
2	Course Title	Stratigraphy and Paleobiology	
3	Course Type	Core Course	
4	Course Level	500	
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject	
6	Course Learning Outcome (CLO)	Students will acquire insight in the various fundamental and advance components and aspects of the Indian Stratigraphy and Paleobiology . Students will also develop theoretical reasoning and knowledge for practical use. Understanding of the Ancient Indian Knowledge of Indian terrain, Satpta-dwipas. Concept of Dash avatar of evolution of life.	
7	Credit Value	6	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 6 L-T-P: 90			
Unit	Topics		No. Of Lectures
I	Ancient Indian knowledge about Indian Terrains and the concept of sapta-dwipas. Dash-avatar concept of evolution of Life. Dharwar Craton: Archean Stratigraphic evolution, tectonic structures and distribution. Economic importance of Dharwar Craton. Bastar Craton: Archean Stratigraphic evolution and tectonic structures and distribution. Economic importance of Older metamorphics and Kotri – Dongargarh orogen. Singhbhum Craton: Archean Stratigraphy evolution, tectonic structures and distribution. economic importance of Singhbhum Craton. Cuddapah Proterozoic basin: Stratigraphy and economic importance. Activities: Poster presentation, Seminar-PPT		18
II	Bundelkhand Craton: Archean Stratigraphic evolution, tectonic structures and distribution. economic importance of Bundelkhand Craton. Aravalli/Rajasthan Craton: Litho-Tectonic structures, general stratigraphy and economic importance of Aravalli Craton. Vindhyan Proterozoic basin: Stratigraphy and economic importance Tectonic structures of Satpuda Mobile Belt (SMB). Stratigraphy and economic importance of Sausar Group, Mahakoshal Supergroup, Bijawar and Gwailor Group. Activities: Poster presentation, Seminar-PPT		18

III	Gondwana Supergroup: Geographical distribution, Stratigraphic Classification, and economic importance. Stratigraphic Classification and fossil records of Lameta and Bagh groups. Deccan traps: Distribution, Classification and economic importance. Tectonic characters of Kutch Basin in Jurassic. Triassic of Spiti valley. Siwalik group: Stratigraphy, distribution and fossil records of Siwalik Group. Tectonic Thrust zones of Himalayan Mobile Belt. Activities: Poster presentation, Seminar-PPT	18
IV	Modes of fossilization and uses of fossils. Morphology, classification, evolution, and geological history of: Trilobites, Graptolites, Echinoids and Corals, Brachiopoda, Gastropoda, Lamellibranchia and Cephalopoda. Activities: Poster presentation, Seminar-PPT	18
V	Succession of the vertebrate life through the geological time. Classification of vertebrates and general characters of various classes. Principles of evolution. Evolutionary history of Human, Elephant and Horse. Micropaleontology: Classification, separation of microfossils. Uses of microfossil. Morphology and geological history of foraminifera. Activities: Poster presentation, Seminar-PPT	18
Keywords/ Tags: Dharwar Craton, Bundelkhand Craton, Elephant and Horse, vertebrates		

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Krishnan, M S: Geology of India and Burma. Higginbothams, Madras
 Ravindra Kumar: Historical Geology and Stratigraphy of India. John Wiley
 Vaidyanadhan R and Ramakrishna M 2012: Geology of India. 2e, Geol. Soc. India.
 Wadia, D N : Geology of India. McMillan & Co.
 Ananthraman and Jain: Textbook of Palaeontology. GSI
 Andrew 1961: Studies in Palaeontology. John Wiley
 Boggs Sam Jr 1995: Principles of Sedimentary and Stratigraphy. Prentice Hall
 Doyle and Brennet MR 1996: Unlocking the Stratigraphy: Concepts and Application. Prentice
 Banner F T and Lord A R: Aspects of Micropalaeontology.
 Clarkeson ENK 1998: Invertebrate Palaeontology and Evolution. Blackwell
 Glassner M P: Principles of Micropalaeontology.
 Haq B U and Boersma A: Introduction to Marine Micropalaeontology.
 Jones D J: Microfossils.
 Moore, Lalicher and Fischer: Invertebrate Palaeontology.
 Prothero DR 1998: Bringing Fossils to Life: An Introduction to Palaeobiology. McGr
 Romer A S: Vertebrate Palaeontology.
 Seward S E 1966: Plant Life through Ages. Heffner
 Shrock and Twenhofell: Palaeontology Invertebrate.
 Stearns CW and Carrol RL 1989: Palaeontology -the Record of Life. John Wiley
 Woods, Henry: Invertebrate Palaeontology.

dash avatar and evolution

<https://ijcrt.org/papers/IJCRT2401457.pdf>

saptadwipa concept

<https://timesofindia.indiatimes.com/etimes/trending/did-the-bhagavata-purana-describe-7-continent-before-cartographers/articleshow/113296961.cms>

[https://www.academia.edu/125732240/Sapta Dwipa Vasumathi Seven continents in Bhagavatha Purana](https://www.academia.edu/125732240/Sapta_Dwipa_Vasumathi_Seven_continents_in_Bhagavatha_Purana)

<https://en.wikipedia.org/wiki/Jambudv%C4%ABpa>

Part D- Assessment and Evaluation

Suggested Continuous evaluation Methods:

Maximum Marks: **100**

Continuous Comprehensive evaluation (CCE): **40**

Mid Term Examination: **60**

Internal Assessment :

Continuous Comprehensive evaluation (CCE):

Class Test/Presentation/ Assignment/
Quiz/Debate/Poster making/Group Discussion etc.

40

External Assessment :

Mid Term Examination

Section(A): Very Short Questions

Section (B): Short Questions

Section(C): Long Questions

60

Any remarks/Suggestions:

Practicum Paper: Scheme C-1 for ONE Year PG Program				
Part A- Introduction				
Program: ONE Year PG Program		Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
Subject: Geology				
1	Course Code	PC31		
2	Course Title	Stratigraphy and Paleobiology		
3	Course Type	Core Course		
4	Course Level	500		
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject		
5	Course Learning Outcome (CLO)	The Practicum Part will enhance the theoretical reasoning by directly exposing the students to representative samples/ models/ problems. This will help students improve the understanding of the subject Stratigraphy and Paleobiology in totality. Understanding of ancient Indian knowledge of Terrains		
6	Credit Value	4		
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40	
Part B : Content of the Course				
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 2 L-T-P: 120				
Topics				No. Of Lectures
1	1.Plotting of tectonic features of major cratons. 2. Plotting of proterozoic basins of India. 3. Chronological ordering of various rock samples. 4. Morphology of fossils of Trilobites, Graptolites, Echinoids and Corals, Brachiopoda, Gastropoda, Lamellibranchia and Cephalopoda class and phyllums. 5. Study of microfossils.			120
2	Group discussions on ancient Indian understanding on Terrains.			
3	Poster presentation on ancient Indian knowledge of Terrains and the concept of Sapta-dwipas.			
Keywords/ Tags: major cratons, proterozoic basins of India, microfossil				
Part C- Learning Resources				
Text Books, Reference Books, Other Resources				

Suggested Readings:

Krishnan, M S: Geology of India and Burma. Higginbothams, Madras
Ravindra Kumar: Historical Geology and Stratigraphy of India. John Wiley
Vaidyanadhan R and Ramakrishna M 2012: Geology of India. 2e, Geol. Soc. India.
Wadia, D N : Geology of India. McMillan & Co.
Ananthraman and Jain: Textbook of Palaeontology. GSI
Andrew 1961: Studies in Palaeontology. John Wiley
Boggs Sam Jr 1995: Principles of Sedimentary and Stratigraphy. Prentice Hall
Doyle and Brennet MR 1996: Unlocking the Stratigraphy: Concepts and Application. Prentice
Banner F T and Lord A R: Aspects of Micropalaeontology.
Clarksen ENK 1998: Invertebrate Palaeontology and Evolution. Blackwell
Glassner M P: Principles of Micropalaeontology.
Haq B U and Boersma A: Introduction to Marine Micropalaeontology.
Jones D J: Microfossils.
Moore, Lalicher and Fischer: Invertebrate Palaeontology.
Prothero DR 1998: Bringing Fossils to Life: An Introduction to Palaeobiology. McGr
Romer A S: Vertebrate Palaeontology.
Seward S E 1966: Plant Life through Ages. Heffner
Shrock and Twenhofell: Palaeontology Invertebrate.
Stearns CW and Carrol RL 1989: Palaeontology -the Record of Life. John Wiley
Woods, Henry: Invertebrate Palaeontology.

dash avatar and evolution

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saptadwipa concept

<https://timesofindia.indiatimes.com/etimes/trending/did-the-bhagavata-purana-describe-7-continents-before-cartographers/articleshow/113296961.cms>

[https://www.academia.edu/125732240/Sapta Dwipa Vasumathi Seven continents in Bhagavatha Purana](https://www.academia.edu/125732240/Sapta_Dwipa_Vasumathi_Seven_continents_in_Bhagavatha_Purana)

<https://en.wikipedia.org/wiki/Jambudv%C4%ABpa>

Part D- Assessment and Evaluation**Suggested Continuous evaluation Methods:**Maximum Marks: **100**Continuous Comprehensive evaluation (CCE): **40**Mid Term Examination: **60****Internal Assessment :**

Continuous Comprehensive evaluation (CCE):

Seminar/Demonstration/Assignment
etc.**40****External Assessment :**

Mid Term Examination

Table work/ Experiments, Practical
Record Files, Viva-Voce**60****Any remarks/Suggestions:**

Theory Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: ONE Year PG Program		Class: M.Sc. I Semester	Year: 2025
Session: 2025-26			
Subject: Geology			
1	Course Code	CC32	
2	Course Title	Petrology	
3	Course Type	Core Course	
4	Course Level	500	
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject	
6	Course Learning Outcome (CLO)	Students will acquire insight in the various fundamental and advance components and aspects of the subject Petrology. Students will also develop theoretical reasoning and knowledge for practical use. Understanding of Ancient Indian knowledge base on rocks.	
7	Credit Value	6	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 6			
L-T-P: 90			
Unit	Topics		No. Of Lectures
I	<i>Ancient Indian knowledge base about various rocks and their classification. Stones used in great ancient structures—major Forts, famous Temples, Rock-Cut Cave monuments.</i> Origin of primary basic magmas. Factors affecting magma composition. Silicate melt equilibria of Monary (Silica), Binary (Ab–An, Di–An), and Ternary (Ab–An–Di), and (Fo–Fa–Silica) silicate systems and their significance. Evolution of magma-differentiation and assimilation. Activities: Quiz, Seminar-PPT		18
II	Forms, Structures and textures of igneous rocks and their significance. Classification of igneous rocks. Reaction principle. Reaction series. Layered igneous structures. Petrogenesis of Lamprophyre. Activities: Quiz, Seminar-PPT		18
III	Origin of sediments. Modes of transportations of sediments. Primary, biogenic and chemical sedimentary structures. Sedimentary textures (clastic and non-clastic sedimentary rocks) Sedimentary environments: Continental (fluvial, lacustrine, aeolian and glacial), Transitional, and Marine environments. Evaporites and volcaniclastic sediments.		18

	Sedimentary facies. Facies modeling for marine, non-marine and mixed sediments. Activities: Quiz, Seminar-PPT, posters	
IV	Kinds of metamorphism, prograde and retrograde metamorphism.. Metamorphic differentiation. Structures and textures of metamorphic rocks. Regional and contact metamorphism of pelitic and impure carbonate, and mafic rocks. Mineral assemblages and P/T conditions. Metamorphic mineral zones. Activities: Quiz, Seminar-PPT	18
V	Characteristics of different metamorphic grades, facies and facies series. Experimental and thermodynamic appraisal of metamorphic reactions. Plate tectonics and metamorphic zones. Paired metamorphic belts. Metasomatism and their important products and Granitization. Origin and types of migmatites. Activities: Quiz, Seminar-PPT	18
Keywords/ Tags: Evolution of magma, Reaction principle, Transitional, and Marine environments		
Part C- Learning Resources		
Text Books, Reference Books, Other Resources		
Suggested Readings: - Ram S. Sharma, Editors, 2016: Metamorphic Petrology Concepts and Methods. Geol Soc of India, Bengaluru. Rathore, B S, 2021: Igneous Petrology for Beginners. Notion Press Sengupta, S 1997: Introductions of Sedimentology. Oxford IBH Best, M.G. 1986: Igneous and Metamorphic Petrology, CBS Publ. Bose, M.K.1997: Igneous Petrology, World Press Bucher, K & Frey, M. 1994: Petrogenesis of Metamorphic Rocks, Springer-V Hall, A. 1987: Igneous Petrology. Hyndman 1999: Petrology of Igneous and Metamorphic Rocks. McGraw Allen, P. 1997: Earth Surface Processes. Blackwell Davis, R A, 1992: Depositional Systems. Prentice hall Einsels, G 1992: Sedimentary Basins. Springer Verlag Miall AD, 2000: Principles of Sedimentary Basin Analysis. Springer Verlag Nichols, G. 1999: Sedimentology and Stratigraphy. Black well Pettijohn, F J: Sedimentary Rocks. 3rd ed. Reading, H G, 1996: Sedimentary Environments. Black well Tucker, M E 1989: Sedimentary Petrology. Blackwell. Kretz, R. 1994: Metamorphic crystallization, John Wiley Mc Birney, A.R. 1993: Igneous Petrology, Jones and Bartlet Publ Miyashiro, A: Metamorphism and Metamorphic Rocks. George Allen Unwin Phillips, A. 1992: Igneous and Metamorphic Petrology, Prentice Hall. Turner, F J. and Verhoogen J, 1982: Igneous and Metamorphic Petrology, McGraw Winkler, HGF: Petrogenesis of Metamorphic Rocks. Springer Verlag Winter, J D, 2005: Principles of Igneous and Metamorphic Petrology. 2e, PHI Delhi Yardley, B W. 1989: An Introduction to Metamorphic Petrology, Longman https://www.exoticindiaart.com/book/details/geology-in-ancient-vedic-literature-nak921/		
Part D- Assessment and Evaluation		
Suggested Continuous evaluation Methods: Maximum Marks: 100 Continuous Comprehensive evaluation (CCE): 40 Mid Term Examination: 60		
Internal Assessment : Continuous Comprehensive evaluation	Class Test/Presentation/ Assignment/ Quiz/Debate/Poster making/Group Discussion etc.	40

(CCE):		
External Assessment : Mid Term Examination	Section(A): Very Short Questions Section (B): Short Questions Section(C): Long Questions	60
Any remarks/Suggestions:		

Practicum Paper: Scheme C-1 for ONE Year PG Program				
Part A- Introduction				
Program: ONE Year PG Program		Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
Subject: Geology				
1	Course Code	PC32		
2	Course Title	Petrology		
3	Course Type	Core Course		
4	Course Level	500		
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject		
6	Course Learning Outcome (CLO)	The Practicum Part will enhance the theoretical reasoning by directly exposing the students to representative samples/ models/ problems. This will help students improve the understanding of the subject Petrology in totality.		
		Understanding of Ancient Indians about rocks.		
7	Credit Value	4		
8	Total Marks	Max. Marks:	Minimum Passing Marks:40	
		100 (40+60)		
Part B : Content of the Course				
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 2 L-T-P: 120				
Topics				No. Of Lectures
1. 1. Study of igneous rocks in hand specimen; study of igneous rocks in thin sections; structures and textures in igneous rocks; calculation of CIPW norms and Niggli values; plotting of chemical data on different variation diagrams for evaluation of magma and rock types; preparation of igneous rock slides. 2. Study of sedimentary rocks in hand specimen; study of sedimentary rocks in thin section; study of primary, Grain-size Analysis by sieving Method: Plotting of size-distribution data as Frequency and Cumulative. Curves; Computation of Statistical Parameters and Interpretation. secondary and biogenic sedimentary structures in hand specimen; aerial photographs and field exercises related to palaeo-current data from different environments; exercises related to analysis and interpretation of depositional sedimentary environments; staining and mineral identification in carbonate rocks; detailed study of diagenetic features in thin sections; preparation of thin section of sedimentary rocks. 3. Study of metamorphic rocks in hand specimen; study of metamorphic rocks in thin sections; structures and textures in metamorphic rocks; interpretation of reaction texture; plotting of chemical data on ACF, AKF and AFM diagrams; preparation of metamorphic rock slides.				120

2. Group discussion on Ancient Indian knowledge base about various rocks and their classification.
3. Poster presentation on Various important temples of India and their rocks.
Keywords/ Tags: CIPW norms and Niggli values, thin section, ACF, AKF and AFM diagrams

Part C- Learning Resources
Text Books, Reference Books, Other Resources
Suggested Readings: - Ram S. Sharma, Editors, 2016: Metamorphic Petrology Concepts and Methods. Geol Soc of India, Bengaluru. Rathore, B S, 2021: Igneous Petrology for Beginners. Notion Press Sengupta, S 1997: Introductions of Sedimentology. Oxford IBH Best, M.G. 1986: Igneous and Metamorphic Petrology, CBS Publ. Bose, M.K.1997: Igneous Petrology, World Press Bucher, K & Frey, M. 1994: Petrogenesis of Metamorphic Rocks, Springer-V Hall, A. 1987: Igneous Petrology. Hyndman 1999: Petrology of Igneous and Metamorphic Rocks. McGraw Allen, P. 1997: Earth Surface Processes. Blackwell Davis, R A, 1992: Depositional Systems. Prentice hall Einsels, G 1992: Sedimentary Basins. Springer Verlag Miall AD, 2000: Principles of Sedimentary Basin Analysis. Springer Verlag Nichols, G. 1999: Sedimentology and Stratigraphy. Black well Pettijohn, F J: Sedimentary Rocks. 3rd ed. Reading, H G, 1996: Sedimentary Environments. Black well Tucker, M E 1989: Sedimentary Petrology. Blackwell. Kretz, R. 1994: Metamorphic crystallization, John Wiley Mc Birney, A.R. 1993: Igneous Petrology, Jones and Bartlet Publ Miyashiro, A: Metamorphism and Metamorphic Rocks. George Allen Unwin Phillpots, A. 1992: Igneous and Metamorphic Petrology, Prentice Hall. Turner, F J. and Verhoogen J, 1982: Igneous and Metamorphic Petrology, McGraw Winkler, HGF: Petrogenesis of Metamorphic Rocks. Springer Verlag Winter, J D, 2005: Principles of Igneous and Metamorphic Petrology. 2e, PHI Delhi Yardley, B W. 1989: An Introduction to Metamorphic Petrology, Longman https://www.exoticindiaart.com/book/details/geology-in-ancient-vedic-literature-nak921/

Part D- Assessment and Evaluation		
Suggested Continuous evaluation Methods:		
Maximum Marks:	100	
Continuous Comprehensive evaluation (CCE):	40	
Mid Term Examination:	60	
Internal Assessment :	Seminar/Demonstration/Assignment etc.	
Continuous Comprehensive evaluation (CCE):		40
External Assessment :	Table work/ Experiments, Practical	
Mid Term Examination	Record Files, Viva-Voce	60
Any remarks/Suggestions:		

Theory Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: ONE Year PG Program	Class: M.Sc. II Semester	Year: 2025	Session: 2025-26
Subject: Geology			
1	Course Code	CC41	
2	Course Title	Mineral Exploration, Mining Geology and Mineral Dressing	
3	Course Type	Core Course	
4	Course Level	500	
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject	
6	Course Learning Outcome (CLO)	Students will acquire insight in the various fundamental and advance components and aspects of the subject Mineral Exploration, Mining Geology and Mineral Dressing. Students will also develop theoretical reasoning and knowledge for practical use. Understanding of Ancient Indian skill and achievements in Exploration, Mining and metallurgy.	
7	Credit Value	6	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 6			
L-T-P: 90			
Unit	Topics		No. Of Lectures
I	<i>Introduction to Ancient Indian achievements in knowledge of mineral exploration, mining and mineral dressing. Mahrouli Iron Pillar—Highest quality Iron (Steel) metallurgy. Ancient Zawar Pb-Zn deposits and large scale mining.</i> Methods of surface and subsurface exploration, prospecting for economic minerals— drilling, sampling and assaying. Types and methods. Channel sampling and placer sampling, underground mine sampling. Geological controls of ore deposits and ore-guides. Activities: Quiz, Seminar-PPT		18
II	Geophysical techniques — gravity, electrical, magnetic, airborne and seismic. Borehole logging and surveys for deviation. Geomorphological and remote sensing techniques. Assaying and calculation of ore reserves. Classification of reserves (UNFC). Geochemical and geobotanical Exploration methods. Path finder elements. Primary dispersion patterns, syngenetic and epigenetic diffusion. Activities: Quiz, Seminar-PPT		18
III	Mining terminology, mine-supports, subsidence, mine ventilation, pumping of mine water. Classification of mining methods. Alluvial mining and opencast mining. Introduction to Ocean Bottom Mining.		18

	Activities: Quiz, Seminar-PPT	
IV	Stopping methods: open stopping, timbered stope, and shrinkage stope. Haulage and winding. Coal mining: underground room and pillar method, long wall methods. Opencast strip mining. Introduction to equipment used in coal mining. Activities: Quiz, Seminar-PPT	18
V	Mineral Dressing: Scope of mineral dressing. Types of crushers and grinding mills. Laboratory sizing of particles. Industrial screening. Types of classifiers. Gravity separations, heavy-medium separation, magnetic separation, electrostatic separation, froth floatation technique of separation, and amalgamation. Thickening and dewatering. Activities: Quiz, Seminar-PPT, Posters	18
Keywords/ Tags: ore-guides, Borehole logging , Path finder elements, dewatering		

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Arogyaswamy, R N P, 1996: Courses in Mining Geology. Oxford/ IBH
 Dhana Raju R: Handbook of Mineral Exploration and Ore Petrology: Techniques & Applications Geol soc. India
 Krishnaswamy, S, 1972: India's Mineral Resources. Oxford and IBH
 Haldar, S K, 2009: Mineral Exploration: Principles and Applications. Elsevier
 Mukherjee, A D, 1999: Elements of Prospecting for Non Fuel Mineral Deposits. Allied Press
 Umeshwar Prasad 2000: Economic Geology. CBS
 Bateman, 1981: Economic Mineral Deposits. Wiley
 Deb, S., 1980: Industrial Minerals and Rocks of India. Allied P New Delhi
 Dobrin, M B, and Savit C H, 1988: Introduction to Geophysical Prospecting. McGraw
 Evans, J M 1993: Ore Geology and Industrial Minerals. Blackwell
 Hawkes, H and Webb J S, 1979: Geochemistry in Mineral Exploration. Harper NY
 Levinson, A A, 1974: Introduction to exploration geochemistry-T/B. Applied P IL
 Parasnis, D S, 1996: Principles of Applied Geophysics. 5e, Prentice Hall/ Springer
 Richards, R H and Locke, C E 1940, Text Book of Ore Dressing. McGraw Hill
 Richey J E: Elements of Engineering Geology. Sir Issac Pitman & Sons
 Taggart, A F, 1948, Handbook of Mineral Dressing. Wiley New York
 Trefethen N C: Textbook of Geology and Engineering Geology. McMillan.

Metallurgy in ancient India
<https://www.youtube.com/watch?v=vEwnOvyIMdE>
<https://www.scribd.com/document/435308900/Metallurgy-in-Ancient-India-pdf>
<https://www.scribd.com/document/638313125/Metallurgy-in-India>
Minerals and Mining in ancient India
<https://www.exoticindiaart.com/book/details/minerals-and-mining-in-ancient-india-from-earliest-times-to-beginning-of-christian-era-uax073/>
[https://www.researchgate.net/publication/289193892 Mining in ancient India - Glimpses of the glorious past](https://www.researchgate.net/publication/289193892_Mining_in_ancient_India_-_Glimpses_of_the_glorious_past)

Ancient Indian mining technology
[https://www.researchgate.net/publication/388461071 Ancient Indian Mining Technology - Rasayana Vidya](https://www.researchgate.net/publication/388461071_Ancient_Indian_Mining_Technology_-_Rasayana_Vidya)
<https://www.slideshare.net/slideshow/mining-and-metallurgy-of-ancient-india/122061814>
<https://geographyandyou.com/geoheritage-sites/zawar-worlds-oldest-zinc-mining-and-metallurgy-site>
For TIN
[https://os.pennds.org/archaeobib_filestore/pdf_articles/bookchapters/2015 Upadhyay.pdf](https://os.pennds.org/archaeobib_filestore/pdf_articles/bookchapters/2015_Upadhyay.pdf)
<https://enrouteindianhistory.com/unearthing-a-precious-metal-gold-mining-in-ancient-india/>

Part D- Assessment and Evaluation

Suggested Continuous evaluation Methods:

Maximum Marks: **100**
 Continuous Comprehensive evaluation (CCE): **40**
 Mid Term Examination: **60**

Internal Assessment : Continuous Comprehensive evaluation (CCE):	Class Test/Presentation/ Assignment/ Quiz/Debate/Poster making/Group Discussion etc.	40
External Assessment : Mid Term Examination	Section(A): Very Short Questions Section (B): Short Questions Section(C): Long Questions	60

Any remarks/Suggestions:

Practicum Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: ONE Year PG Program	Class: M.Sc. II Semester	Year: 2025	Session: 2025-26
Subject: Geology			
1	Course Code	PC41	
2	Course Title	Mineral Exploration, Mining Geology and Mineral Dressing	
3	Course Type	Core Course	
4	Course Level	500	
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject	
6	Course Learning Outcome (CLO)	The Practicum Part will enhance the theoretical reasoning by directly exposing the students to representative samples/ models/ problems. This will help students improve the understanding of the subject Mineral Exploration, Mining Geology and Mineral Dressing in totality. Understanding of Ancient Indian skill and achievements in Exploration, Mining and metallurgy.	
7	Credit Value	4	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 2 L-T-P: 120			
Topics			No. Of Lectures
Geological mapping: Learning to interpret and create geological maps and mapping structural features like folds and faults. Geochemical methods: Analyzing soil, water, and rock samples for trace elements to identify potential mineralization. Calculation of ore reserve estimation. Weighted volume estimation methods, Volume estimation by triangular method, volume by the method of polygon, volume by prismoidal formula. sampling calculation based on minimum stopping width, calculation of average assay from core drill samples, Tonnage factor and its calculation. Ore deposit evaluation: Assessing the size, grade, and economic viability of ore deposits. Group discussion on Ancient Indian knowledge and achievement in Mineral Mining and metallurgy Poster presentation of major ancient mining sites and trades.			120
Keywords/ Tags: Geochemical methods, Mining methods, ore samples			
Part C- Learning Resources			

Text Books, Reference Books, Other Resources

Suggested Readings:

Arogyaswamy, R N P, 1996: Courses in Mining Geology. Oxford/ IBH
Dhana Raju R: Handbook of Mineral Exploration and Ore Petrology: Techniques & Applications Geol soc. India
Krishnaswamy, S, 1972: India's Mineral Resources. Oxford and IBH
Haldar, S K, 2009: Mineral Exploration: Principles and Applications. Elsevier
Mukherjee, A D, 1999: Elements of Prospecting for Non Fuel Mineral Deposits. Allied Press
Umeshwar Prasad 2000: Economic Geology. CBS
Bateman, 1981: Economic Mineral Deposits. Wiley
Deb, S., 1980: Industrial Minerals and Rocks of India. Allied P New Delhi
Dobrin, M B, and Savit C H, 1988: Introduction to Geophysical Prospecting. McGraw
Evans, J M 1993: Ore Geology and Industrial Minerals. Blackwell
Hawkes, H and Webb J S, 1979: Geochemistry in Mineral Exploration. Harper NY
Levinson, A A, 1974: Introduction to exploration geochemistry-T/B. Applied P IL
Parasnis, D S, 1996: Principles of Applied Geophysics. 5e, Prentice Hall/ Springer
Richards, R H and Locke, C E 1940, Text Book of Ore Dressing. McGraw Hill
Richey J E: Elements of Engineering Geology. Sir Issac Pitman & Sons
Taggart, A F, 1948, Handbook of Mineral Dressing. Wiley New York
Trefethen N C: Textbook of Geology and Engineering Geology. McMillan.

Metallurgy in ancient India

<https://www.youtube.com/watch?v=vEwnOvyIMdE>

<https://www.scribd.com/document/435308900/Metallurgy-in-Ancient-India-pdf>

<https://www.scribd.com/document/638313125/Metallurgy-in-India>

Minerals and Mining in ancient India

<https://www.exoticindiaart.com/book/details/minerals-and-mining-in-ancient-india-from-earliest-times-to-beginning-of-christian-era-uax073/>

<https://www.researchgate.net/publication/289193892> Mining in ancient India -
[Glimpses of the glorious past](#)

Ancient Indian mining technology

<https://www.researchgate.net/publication/388461071> Ancient Indian Mining Technology -
[Rasayana Vidya](#)

<https://www.slideshare.net/slideshow/mining-and-metallurgy-of-ancinet-india/122061814>

<https://geographyandyou.com/geoheritage-sites/zawar-worlds-oldest-zinc-mining-and-metallurgy-site>

For TIN

https://os.pennds.org/archaeobib_filestore/pdf_articles/bookchapters/2015_Upadhyay.pdf

<https://enrouteindianhistory.com/unearthing-a-precious-metal-gold-mining-in-ancient-india/>

Part D- Assessment and Evaluation**Suggested Continuous evaluation Methods:**Maximum Marks: **100**Continuous Comprehensive evaluation (CCE): **40**Mid Term Examination: **60****Internal Assessment :**

Continuous Comprehensive evaluation (CCE):

Seminar/Demonstration/Assignment
etc.**40****External Assessment :**

Mid Term Examination

Table work/ Experiments, Practical
Record Files, Viva-Voce**60****Any remarks/Suggestions:**

Theory Paper: Scheme C-1 for ONE Year PG Program				
Part A- Introduction				
Program: ONE Year PG Program		Class: M.Sc. II Semester	Year: 2025	Session: 2025-26
Subject: Geology				
1	Course Code	CC42		
2	Course Title	Environmental Geology and Geochemistry		
3	Course Type	Core Course		
4	Course Level	500		
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject		
5	Course Learning Outcome (CLO)	Students will acquire insight in the various fundamental and advance components and aspects of the subject Environmental Geology and Geochemistry . Students will also develop theoretical reasoning and knowledge for practical use. Understanding of holistic outlook of environment in ancient India.		
6	Credit Value	6		
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40	
Part B : Content of the Course				
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 6 L-T-P: 90				
Unit	Topics			No. Of Lectures
I	Environmental understanding and practices and holistic concept in ancient India. Environmental Planning in Saraswati-Indus Valley civilization. Modern Concept of Environmental Geology. Classification of Environment. Positive and Negative Feedback Mechanism in environment. Earth’s Heat Budget. Stefan-Boltzmann Equation, Global Warming and Causes of Climate Change. Earth’s natural hazardous processes and its impact on environment— Seismic, landslides and coastal hazards. Activities: Quiz, Seminar-PPT, Posters			18
II	Impact assessment of degradation and contamination of surface water and ground water quality due to industrialization and urbanization. Soil profiles, soil types; and soil quality degradation due to irrigation, use of fertilizer and pesticides. Badlands: - forms, characteristics of badland systems, stages, causes and mitigation. Yamuna – Chambal badlands of India. Activities: Quiz, Seminar-PPT, Posters			18
III	Wetlands: Ramsar conference resolution, classification, natural and artificial wetlands, problems of reclamation of wetlands, use of wetlands, major wetlands of India. Water logging problems. Causes of floods; flood zones of India. Flood hazards and management. Environmental problems related to dams and reservoirs.			18

	Activities: Quiz, Seminar-PPT, Posters	
IV	Impacts of mining activities on the environment. Environmental management in mining areas. Environmental pollution due to industries, energy resources, and urbanization. Desertification and Degradation of land. Anti-desertification measures. Environmental pollution, hazards due to nuclear and thermal power energy establishments. Activities: Quiz, Seminar-PPT, Posters	18
V	Cosmic abundance of elements. Composition of the planets and meteorites. Composition and structure of the earth: Crust, mantle and core. Geochemical Classification of the elements. Geochemical Cycle. Mineral Stability Series. Principle and equation of thermodynamics in geochemistry. Geochemistry of Igneous, Sedimentary and metamorphic rocks. Principle of geochemical Prospecting. Activities: Quiz, Seminar-PPT, Posters	18
Keywords/ Tags: Earth's Heat Budget, Soil profiles, Badlands, Geochemical Cycle		

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings :

Patwardhan A M. 1999: The Dynamic Earth System. Prentice Hall
Subramaniam V. 2001: Textbook in Environmental Science. Narosa international
Sumit K 1992: Environmental Hazards. Routledge
T.E. Graedel & P.J. Crutzen, 1993: Atmospheric Change. W H Freeman and Co
Bell F G. 1999: Geological Hazards. Rout ledge London
Carla W. Montgomery, 2011. Environmental Geology. 9e, McGraw Hill
Hsai-Yang Fang 1997: Introduction to Environmental Geotechnology, CRC Press
Valdiya K S 1987: Environmental Geology- Indian context. Tata-McGraw
Gunter Faure, 1991. Principles and Applications of Inorganic Geochemistry: A Comprehensive Textbook. Macmillan Coll Div
Kula C. Misra. 2012. Introduction to Geochemistry: Principles and Applications. Wiley
Rathore, B.S.; Basics of Crystallography, Mineralogy and Geochemistry. Notion Press India, 2020.
William M. White. 2015. Isotope Geochemistry. (Wiley Works) Bell F G. 1999: Geological Hazards. Rout ledge London.
Smith K. 1992: Geological Hazards. Rout ledge London
Nipunage, D.S. and Kulkarni, D.K. (2010). Deo-rahati: An Ancient Concept of Biodiversity Conservation. Asian Agri-History. Volume 14(2), 185-196.
Pandey, Archana (2016). Society and Environment in Ancient India (Study of Hydrology). International Journal of Humanities and Social Science Invention. Volume 5(2), 26-31. ISSN (online) 2319-7722. www.ijhssi.org/ 335 Attitudes towards Environment, Science and Technology
Satpathy, Binod Bihari (not dated). History of Science and Technology in India. DDCE/History (M.A.)/SLM/Paper.
Tanwar, Renu (2016). Environment Conservation in Ancient India. IOSR Journal of Humanities and Social Sciences. Volume 21(9), Ver. 11, 01-04.
Narayanan, Vasudha (2001). Water, Wood and Wisdom: Ecological perspectives from the Hindu Traditions. Daedalus. Volume 130 (4), 179-206.
Vahia, Mayank (2015). Evaluating the Claims of Ancient Indian Achievements in Science. Current Science. Volume 108(12), 25th June 2015, 2145-48.
<https://egyankosh.ac.in/bitstream/123456789/64796/1/Unit18.pdf>

Part D- Assessment and Evaluation

Suggested Continuous evaluation Methods:

Maximum Marks: **100**
Continuous Comprehensive evaluation (CCE): **40**
Mid Term Examination: **60**

Internal Assessment : Continuous Comprehensive evaluation (CCE):	Class Test/Presentation/ Assignment/ Quiz/Debate/Poster making/Group Discussion etc.	40
External Assessment : Mid Term Examination	Section(A): Very Short Questions Section (B): Short Questions Section(C): Long Questions	60

Any remarks/Suggestions:

Practicum Paper: Scheme C-1 for ONE Year PG Program				
Part A- Introduction				
Program: ONE Year PG Program		Class: M.Sc. II Semester	Year: 2025	Session: 2025-26
Subject: Geology				
1	Course Code	PC42		
2	Course Title	Environmental Geology and Geochemistry		
3	Course Type	Core Course		
4	Course Level	500		
5	Pre-Requisite (if any)	After completing 3 Year Bachelor Degree with Geology Subject		
5	Course Learning Outcome (CLO)	The Practicum Part will enhance the theoretical reasoning by directly exposing the students to representative samples/ models/ problems. This will help students improve the understanding of the subject Environmental Geology and Geochemistry in totality. Understanding of Ancient Indian worldview on Environment.		
6	Credit Value	4		
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40	
Part B : Content of the Course				
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 2				
L-T-P: 120				
Topics				No. Of Lectures
1. 1.Determination of Potential for pollution of groundwater with DRASTIC parameter. 2. Determination of Surface water quality and application of Water Quality Index 3. Study of seismic and flood prone in India; hydrochemistry analysis surface water and subsurface water; classification of groundwater for use in drinking, irrigation and industrial purposes; presentation of chemical analysis; data and plotting; chemical classification diagram; evaluation of environmental impact of air pollution and groundwater pollution; deforestation; landslides. 4. Preparation and interpretation of geochemical maps; Rock/ sediments/ water/ soil analysis. 5. Preparation of classificatory and variation diagrams, REE normalized plots and their interpretation. 2. Group discussions on Ancient Indian Understanding of the Holistic concept of Environment. 3. (a) Essay writing Vedic Concern related to the Environment (b) Ancient Indian concern related to use of arms of Mass Destruction (Brahmastra).				120
Keywords/ Tags: DRASTIC parameter, Water Quality Index, drinking, irrigation, industrial				

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings :

Patwardhan A M. 1999: The Dynamic Earth System. Prentice Hall

Subramaniam V. 2001: Textbook in Environmental Science. Narosa international

Sumit K 1992: Environmental Hazards. Routledge

T.E. Graedel & P.J. Crutzen, 1993: Atmospheric Change. W H Freeman and Co

Bell F G. 1999: Geological Hazards. Rout ledge London

Carla W. Montgomery, 2011. Environmental Geology. 9e, McGraw Hill

Hsai-Yang Fang 1997: Introduction to Environmental Geotechnology, CRC Press

Valdiya K S 1987: Environmental Geology- Indian context. Tata-McGraw

Gunter Faure, 1991. Principles and Applications of Inorganic Geochemistry: A Comprehensive Textbook. Macmillan Coll Div

Kula C. Misra. 2012. Introduction to Geochemistry: Principles and Applications. Wiley

Rathore, B.S.; Basics of Crystallography, Mineralogy and Geochemistry. Notion Press India, 2020.

William M. White. 2015. Isotope Geochemistry. (Wiley Works) Bell F G. 1999: Geological Hazards. Rout ledge London.

Smith K. 1992: Geological Hazards. Rout ledge London

Nipunage, D.S. and Kulkarni, D.K. (2010). Deo-rahati: An Ancient Concept of Biodiversity Conservation. Asian Agri-History. Volume 14(2), 185-196.

Pandey, Archana (2016). Society and Environment in Ancient India (Study of Hydrology). International Journal of Humanities and Social Science Invention. Volume 5(2), 26-31. ISSN (online) 2319-7722. www.ijhssi.org/ 335 Attitudes towards Environment, Science and Technology

Satpathy, Binod Bihari (not dated). History of Science and Technology in India. DDCE/History (M.A.)/SLM/Paper.

Tanwar, Renu (2016). Environment Conservation in Ancient India. IOSR Journal of Humanities and Social Sciences. Volume 21(9), Ver. 11, 01-04.

Narayanan, Vasudha (2001). Water, Wood and Wisdom: Ecological perspectives from the Hindu Traditions. Daedalus. Volume 130 (4), 179-206.

Vahia, Mayank (2015). Evaluating the Claims of Ancient Indian Achievements in Science. Current Science. Volume 108(12), 25th June 2015, 2145-48.

<https://egyankosh.ac.in/bitstream/123456789/64796/1/Unit18.pdf>

Part D- Assessment and Evaluation**Suggested Continuous evaluation Methods:**Maximum Marks: **100**Continuous Comprehensive evaluation (CCE): **40**Mid Term Examination: **60****Internal Assessment :**

Continuous Comprehensive evaluation (CCE):

Seminar/Demonstration/Assignment
etc.**40****External Assessment :**

Mid Term Examination

Table work/ Experiments, Practical
Record Files, Viva-Voce**60****Any remarks/Suggestions:**

Theory Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: ONE Year PG Program		Class: M.Sc. II Semester	Year: 2025
		Session: 2025-26	
Subject: Geology			
1	Course Code	VAC (Employability and Entrepreneurship Skill Course)	
2	Course Title	Employability and Entrepreneurship Skill Course	
3	Course Type	VAC	
4	Pre-Requisite (if any)	After Bachelor Degree with Geology Subject	
5	Course Learning Outcome (CLO)	Students will acquire insight in the various fundamental and advance components and aspects of the subject Employability and Entrepreneurship Skill Course in the chosen field. Students will also develop practical skill along with the theoretical reasoning and knowledge.	
6	Credit Value	2	
7	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practicum (in hours per week): 1 L-T-P: 30			
	Topics		
	(A) The EESC Shall include such important of interest of the students and concerned faculty of the geology department depending upon the facilities available with the department or local industry or as per the demand of a skill and employability assessed by the student and faculty.		
	OR If student does not choose a topic from (A) than he may opt for any one of the following fields for skill development. (B)The following topics suggested for here with 1. Geological Survey and Mapping 2. Geochemical Analysis of ores/mineral 3. Preparation of mining plans for mining operation. 4. Ancient Indian skill as per the choice of the faculties in geology		
Keywords/ Tags:			
Part C- Learning Resources			
Text Books, Reference Books, Other Resources			
Part D- Assessment and Evaluation			
Suggested Continuous evaluation Methods:			
Maximum Marks:		100	
Continuous Comprehensive evaluation (CCE):		40	
Mid Term Examination:		60	
Internal Assessment :		Class Test/Presentation/ Assignment/ Quiz/Debate/Poster making/Group Discussion etc.	40
Continuous Comprehensive			

evaluation (CCE):		
External Assessment : Mid Term Examination	Section(A): Very Short Questions Section (B): Short Questions Section(C): Long Questions	60
Any remarks/Suggestions:		

SCHEME C-1

**M.Sc. ONE YEAR
SUBJECT: GEOLOGY
PROGRAM: One Year PG
(हिंदी)**

BOARD OF STUDIES IN GEOLOGY

For 1-Year PG Programme

Scheme C-1 (For Courses of Science & Arts Discipline having Major Practicum Component)

Year / Semester	Courses Level	Core Courses / Dissertation	Practicum Courses	Internship/Apprenticeship / Seminar OR VAC (CHM/EESC)	Total Credits
First Year	Sem-I	500	CC-31 (6 Credits)	Internship/Apprenticeship <i>OR</i> Seminar (2 Credits)	22
		500	CC-32 (6 Credits)		
	Sem-II	500	PC-31 (4 Credits)	VAC (CHM/EESC) (2 Credits)	22
		500	PC-32 (4 Credits)		

OPTION-2: Course Work & Research Work (Applicable to the UTDs/Colleges having research centers recognized by the University)

Year / Semester	Courses Level	Core Courses / Dissertation	Practicum Courses	Seminar / Research thesis/Project/Patent	Total Credits
First Year	Sem-I	500	CC-31 (6 Credits)	Seminar (2 Credits)	22
		500	CC-32 (6 Credits)		
	Sem-II	-	-	Research thesis / Project / Patent (22 Credits)	22
		-	-		

OPTION-3: Only Research Work (Applicable to the UTDs/Colleges having research centers recognized by the University)

First Year	Sem-I	Research thesis / Research Project / Patent (22 Credits)			22
	Sem-II	Research thesis / Research Project / Patent (22 Credits)			22

Note: (1) UTDs/Colleges with Research Centers have the choice of running all the OPTIONS mentioned above.

(2) Students having 4-Year Under Graduate Degree (Honours / Honours with Research) are eligible for entry in the Semester-I of 1-Year PG Programme.

Theory Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: PG-1 year	Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
विषय: भूविज्ञान			
1	Course Code	CC31	
2	Course Title	Stratigraphy and Paleobiology संस्तर विज्ञान एवं पुराजीवविज्ञान	
3	Course Type	Core Course कोर कोर्स	
4	Course Level	500	
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरांत	
6	Course Learning Outcome (CLO)	विद्यार्थी भारतीय संस्तर विज्ञान और पैलियोबायोलॉजी विषय के विभिन्न मूल और उच्चतर घटकों और पहलुओं में अंतर्दृष्टि प्राप्त करेंगे। छात्र व्यावहारिक उपयोग के लिए सैद्धांतिक तर्क और ज्ञान भी विकसित करेंगे। भारतीय भूभाग, सप्तद्वीपों के प्राचीन भारतीय ज्ञान की समझ। जीवन के विकास के दश अवतार की अवधारणा।	
7	Credit Value	6	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practical (in hours per week): 6 L-T-P: 90			
Unit	Topics		No. Of Lectures
I	भारतीय भूभागों के बारे में ज्ञान और सप्त-द्वीपों की अवधारणा। जीवन के विकास की दश-अवतार अवधारणा। धारवाड़ क्रेटन: आर्कियन संस्तर विज्ञानी विकास, टेक्टोनिक संरचनाएं और वितरण। धारवाड़ क्रेटन का आर्थिक महत्व। बस्तर क्रेटन: आर्कियन संस्तर विज्ञानी विकास और टेक्टोनिक संरचनाएं और वितरण। पुरा-मेटामॉर्फिक्स और कोटरी-डोंगरगढ़ ऑरोजेन का आर्थिक महत्व। सिंहभूम क्रेटन: आर्कियन संस्तर विज्ञानी विकास, टेक्टोनिक संरचनाएं और वितरण। सिंहभूम क्रेटन का संस्तर विज्ञान और आर्थिक महत्व। कडप्पा प्रोटरोज़ोइक बेसिन: स्ट्रेटीग्राफी और आर्थिक महत्व। गतिविधियाँ: पोस्टर प्रस्तुति, सेमिनार-पीपीटी		18
II	बुंदेलखंड क्रेटन: आर्कियन संस्तर विज्ञानी विकास, टेक्टोनिक संरचनाएं और वितरण। बुंदेलखंड क्रेटन का संस्तर विज्ञान और आर्थिक महत्व। अरावली/राजस्थान क्रेटन: लिथो-टेक्टोनिक संरचनाएं, सामान्य संस्तर विज्ञान और अरावली क्रेटन का आर्थिक महत्व। विंध्य प्रोटरोज़ोइक बेसिन: संस्तर विज्ञान और आर्थिक महत्व सतपुड़ा मोबाइल बेल्ट (एसएमबी) की टेक्टोनिक संरचनाएं। सौसर समूह, महाकोशल सुपरग्रुप, बिजावर और ग्वालियर समूह का संस्तर विज्ञान और आर्थिक महत्व। गतिविधियाँ:		18

	पोस्टर प्रस्तुति, सेमिनार-पीपीटी	
III	गोंडवाना सुपरग्रुप: भौगोलिक वितरण, संस्तर विज्ञानी वर्गीकरण और आर्थिक महत्व। लेमेटा और बाघ समूहों का संस्तर विज्ञानी वर्गीकरण और जीवाश्म रिकॉर्ड। डेक्कन ट्रैप: वितरण, वर्गीकरण और आर्थिक महत्व। जुरासिक में कच्छ बेसिन के टेक्टोनिक लक्षण। स्पीति घाटी का ट्राइसिक। शिवालिक समूह: शिवालिक समूह का संस्तर विज्ञान, वितरण और जीवाश्म रिकॉर्ड। हिमालयन मोबाइल बेल्ट के टेक्टोनिक थ्रस्ट जोन। गतिविधियाँ: पोस्टर प्रस्तुति, सेमिनार-पीपीटी	18
IV	जीवाश्मीकरण के तरीके और जीवाश्मों का उपयोग। आकृति विज्ञान, वर्गीकरण, विकास और भूवैज्ञानिक इतिहास: ट्राइलोबाइट्स, ग्रेप्टोलाइट्स, इकीनोएड्स और कोरल, ब्राकिओपोडा, गैस्ट्रोपोडा, लैमेलिब्रांचिया और सेफलोपोडा। गतिविधियाँ: पोस्टर प्रस्तुति, सेमिनार-पीपीटी	18
V	भूवैज्ञानिक समय में कशेरुकी जीवन का विकासक्रम, कशेरुकियों का वर्गीकरण और विभिन्न वर्गों के सामान्य लक्षण। विकास के सिद्धांत। मानव, हाथी और घोड़े का विकासवादी इतिहास। माइक्रोपेलियंटोलॉजी: माइक्रोफॉसिल्स का वर्गीकरण, पृथक्करण। माइक्रोफॉसिल के उपयोग। फोरामिनिफेरा की आकृति विज्ञान और भूवैज्ञानिक इतिहास। गतिविधियाँ: पोस्टर प्रस्तुति, सेमिनार-पीपीटी	18
Keywords/ Tags: Dharwar Craton, Bundelkhand Craton, Elephant and Horse, vertebrates		

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Krishnan, M S: Geology of India and Burma. Higginbothams, Madras
 Ravindra Kumar: Historical Geology and Stratigraphy of India. John Wiley
 Vaidyanadhan R and Ramakrishna M 2012: Geology of India. 2e, Geol. Soc. India.
 Wadia, D N : Geology of India. McMillan & Co.
 Ananthraman and Jain: Textbook of Palaeontology. GSI
 Andrew 1961: Studies in Palaeontology. John Wiley
 Boggs Sam Jr 1995: Principles of Sedimentary and Stratigraphy. Prentice Hall
 Doyle and Brennet MR 1996: Unlocking the Stratigraphy: Concepts and Application. Prentice
 Banner F T and Lord A R: Aspects of Micropalaeontology.
 Clarkeson ENK 1998: Invertebrate Palaeontology and Evolution. Blackwell
 Glassner M P: Principles of Micropalaeontology.
 Haq B U and Boersma A: Introduction to Marine Micropalaeontology.
 Jones D J: Microfossils.
 Moore, Lalicher and Fischer: Invertebrate Palaeontology.
 Prothero DR 1998: Bringing Fossils to Life: An Introduction to Palaeobiology. McGr
 Romer A S: Vertebrate Palaeontology.
 Seward S E 1966: Plant Life through Ages. Heffner
 Shrock and Twenhofell: Palaeontology Invertebrate.
 Stearns CW and Carrol RL 1989: Palaeontology -the Record of Life. John Wiley
 Woods, Henry: Invertebrate Palaeontology.
 dash avatar and evolution
<https://ijcrt.org/papers/IJCRT2401457.pdf>

saptadwipa concept

<https://timesofindia.indiatimes.com/etimes/trending/did-the-bhagavata-purana-describe-7-continents-before-cartographers/articleshow/113296961.cms>

[https://www.academia.edu/125732240/Sapta Dwipa Vasumathi Seven continents in Bhagavatha Purana](https://www.academia.edu/125732240/Sapta_Dwipa_Vasumathi_Seven_continents_in_Bhagavatha_Purana)

<https://en.wikipedia.org/wiki/Jambudv%C4%ABpa>

भाग- द: आकलन और मूल्यांकन विधियाँ

अनुशंसित सतत मूल्यांकन विधियाँ:

अधिकतम अंक: 100

सतत व्यापक मूल्यांकन (सीसीई): 40

मध्य सत्र परीक्षा अंक: 60

आंतरिक मूल्यांकन

सतत मूल्यांकन (सीसीई) अंक :

कक्षा परीक्षण/प्रस्तुति/असाइनमेंट/प्रश्नोत्तरी/वाद-विवाद/पोस्टर
 बनाना/समूह चर्चा आदि।

40

बाह्य मूल्यांकन अंक:

मध्य सत्र परीक्षा अंक:

भाग (अ): अति लघु उत्तरीय प्रश्न
भाग (ब): लघु उत्तरीय प्रश्न
भाग (स): दीर्घ उत्तरीय प्रश्न

60

Practical Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: PG-1 year	Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
विषय: भूविज्ञान			
1	Course Code	PC31	
2	Course Title	Stratigraphy and Paleobiology संस्तर विज्ञान एवं पुराजीवविज्ञान	
3	Course Type	Core Course कोर कोर्स	
4	Course Level	500	
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरान्त	
5	Course Learning Outcome (CLO)	प्रैक्टिकम भाग विद्यार्थियों को प्रतिनिधि नमूनों/मॉडलों/समस्याओं से सीधे अवगत कराकर सैद्धांतिक तर्क को बढ़ाएगा। इससे छात्रों को संस्तर विज्ञान एवं पुराजीवविज्ञान विषय की समग्र समझ को बेहतर बनाने में मदद मिलेगी। भूभागों के प्राचीन भारतीय ज्ञान की समझ	
6	Credit Value	4	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practical (in hours per week): 2			
L-T-P: 120			
Topics			No. Of Lectures
1. प्रमुख क्रेटन्स की टेक्टोनिक विशेषताओं का आरेखण। 2. भारत के प्रोटेरोज़ोइक बेसिनों का आरेखण। 3. विभिन्न रॉक नमूनों का कालानुक्रमिक क्रम। 4. ट्राइलोबाइट्स, ग्रेप्टोलाइट्स, इकिनोएड्स और कोरल, ब्राकिओपोडा, गैस्ट्रोपोडा, लेमेलिब्रांकिया और सेफलोपोडा वर्ग और फाइलम के जीवाश्मों की आकृति विज्ञान। 5. माइक्रोफॉसिल्स का अध्ययन। 2 भू-भागों पर प्राचीन भारतीय समझ पर समूह चर्चा। 3 भू-भागों के प्राचीन भारतीय ज्ञान और सप्त-द्वीपों की अवधारणा पर पोस्टर प्रस्तुति।			120
Keywords/ Tags: major cratons, proterozoic basins of India, microfossil			

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Krishnan, M S: Geology of India and Burma. Higginbothams, Madras
 Ravindra Kumar: Historical Geology and Stratigraphy of India. John Wiley
 Vaidyanadhan R and Ramakrishna M 2012: Geology of India. 2e, Geol. Soc. India.
 Wadia, D N : Geology of India. McMillan & Co.
 Ananthraman and Jain: Textbook of Palaeontology. GSI
 Andrew 1961: Studies in Palaeontology. John Wiley
 Boggs Sam Jr 1995: Principles of Sedimentary and Stratigraphy. Prentice Hall
 Doyle and Brennet MR 1996: Unlocking the Stratigraphy: Concepts and Application. Prentice
 Banner F T and Lord A R: Aspects of Micropalaeontology.
 Clarkeson ENK 1998: Invertebrate Palaeontology and Evolution. Blackwell
 Glassner M P: Principles of Micropalaeontology.
 Haq B U and Boersma A: Introduction to Marine Micropalaeontology.
 Jones D J: Microfossils.
 Moore, Lalicher and Fischer: Invertebrate Palaeontology.
 Prothero DR 1998: Bringing Fossils to Life: An Introduction to Palaeobiology. McGr
 Romer A S: Vertebrate Palaeontology.
 Seward S E 1966: Plant Life through Ages. Heffner
 Shrock and Twenhofell: Palaeontology Invertebrate.
 Stearns CW and Carrol RL 1989: Palaeontology -the Record of Life. John Wiley
 Woods, Henry: Invertebrate Palaeontology.
 dash avatar and evolution
<https://ijcrt.org/papers/IJCRT2401457.pdf>

saptadwipa concept

<https://timesofindia.indiatimes.com/etimes/trending/did-the-bhagavata-purana-describe-7-continents-before-cartographers/articleshow/113296961.cms>

[https://www.academia.edu/125732240/Sapta Dwipa Vasumathi Seven continents in Bhagavatha Purana](https://www.academia.edu/125732240/Sapta_Dwipa_Vasumathi_Seven_continents_in_Bhagavatha_Purana)

<https://en.wikipedia.org/wiki/Jambudv%C4%ABpa>

भाग- द: आकलन और मूल्यांकन विधियाँ

अनुशंसित सतत मूल्यांकन विधियाँ:

अधिकतम अंक: 100

सतत व्यापक मूल्यांकन (सीसीई): 40

मध्य सत्र परीक्षा अंक: 60

आंतरिक मूल्यांकन सतत मूल्यांकन (सीसीई) अंक :	सेमीनार / डेमोस्ट्रेशन/ असाइमेन्ट आदि।	40
बाह्य मूल्यांकन अंक: मध्य सत्र परीक्षा अंक:	टेबल वर्क / प्रयोग, प्रायोगिक रिकॉर्ड,मौखिकी परीक्षा।।	60

Theory Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: PG-1 year	Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
विषय: भूविज्ञान			
1	Course Code	CC32	
2	Course Title	Petrology शैलिकी	
3	Course Type	Core Course कोर कोर्स	
4	Course Level	500	
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरांत	
6	Course Learning Outcome (CLO)	विद्यार्थियों शैलिकी विषय के विभिन्न मूल और उच्चतर घटकों और पहलुओं में अंतर्दृष्टि प्राप्त करेंगे। विद्यार्थियों व्यावहारिक उपयोग के लिए सैद्धांतिक तर्क और ज्ञान भी विकसित करेंगे। चट्टानों पर प्राचीन भारतीय ज्ञान आधार की समझ।	
7	Credit Value	6	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practical (in hours per week): 6 L-T-P: 90			
Unit	Topics		No. Of Lectures
I	विभिन्न चट्टानों और उनके वर्गीकरण के बारे में प्राचीन भारतीय ज्ञान का आधार। प्राचीन भारत की महत्वपूर्ण संरचनाओं के निर्माण में प्रयुक्त शैलें। प्राथमिक मूल मैग्मा की उत्पत्ति। मैग्मा संरचना को प्रभावित करने वाले कारक। मोनरी (सिलिका), बाइनरी (Ab-An, Di-An), और टर्नरी (Ab-An-Di), और (Fo-Fa-Si) सिलिकेट तंत्र में सिलिकेट के प्रगलित द्रव में संतुलन और उनका महत्व। मैग्मा का विकास-		18

	विभेदन और निमज्जन। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	
II	आग्नेय चट्टानों के रूप, संरचना और गठन और उनका महत्व। आग्नेय चट्टानोंका वर्गीकरण। प्रतिक्रिया सिद्धांत। प्रतिक्रिया श्रृंखला। स्तरित आग्नेय संरचनाएँ। लैम्प्रोफायर की पेट्रोजेनेसिस। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	18
III	अवसादों की उत्पत्ति। अवसादों के परिवहन के तरीके। प्राथमिक, जैविक और रासायनिक अवसादी संरचनाएँ। अवसादी गठन (क्लैस्टिक और गैर-क्लैस्टिक अवसादी चट्टानें) अवसादन पर्यावरण: महाद्वीपीय (नदी, झील, एओलियन और हिमनद), संक्रमणकालीन और समुद्री वातावरण। वाष्पशील और ज्वालामुखीय अवसाद । अवसादी फ़ैसीज़, समुद्री, गैर-समुद्री और मिश्रित अवसाद के लिए फ़ैसीज़ मॉडलिंग। गतिविधियाँ: प्रश्नोत्तरी, सेमिनार-पीपीटी, पोस्टर	18
IV	कायांतरण के प्रकार, प्रोग्रेड और रेट्रोग्रेड कायांतरण। कायांतरण विभेदन। कायांतरित शैलों की संरचना और बनावट। पेलिटिक और अशुद्ध कार्बोनेट और मैफ़िक चट्टानों का क्षेत्रीय और संपर्क कायांतरण। खनिज संयोजन और P/T स्थितियाँ। कायांतरण खनिज क्षेत्र। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	18
V	विभिन्न कायांतरण ग्रेड, फ़ैसीज़ और फ़ैसीज़ श्रृंखला की विशेषताएँ। कायांतरण प्रतिक्रियाओं का प्रायोगिक और ऊष्मागतिक मूल्यांकन। प्लेट टेक्टोनिक्स और कायांतरण क्षेत्र। युग्मित कायांतरण बेल्ट। मेटासोमेटिज्म और उनके महत्वपूर्ण उत्पाद और ग्रेनाइटीकरण। माइग्माटाइट्स की उत्पत्ति और प्रकार। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	18
Keywords/ Tags: Evolution of magma, Reaction principle, Transitional, and Marine environments		

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings: -

Ram S. Sharma, Editors, 2016: Metamorphic Petrology Concepts and Methods. Geol Soc of India, Bengaluru.

Rathore, B S, 2021: Igneous Petrology for Beginners. Notion Press

Sengupta, S 1997: Introductions of Sedimentology. Oxford IBH

Best, M.G. 1986: Igneous and Metamorphic Petrology, CBS Publ.

Bose, M.K.1997: Igneous Petrology, World Press

Bucher, K & Frey, M. 1994: Petrogenesis of Metamorphic Rocks, Springer-V

Hall, A. 1987: Igneous Petrology.

Hyndman 1999: Petrology of Igneous and Metamorphic Rocks. McGraw

Allen, P. 1997: Earth Surface Processes. Blackwell

Davis, R A, 1992: Depositional Systems. Prentice hall

Einsels, G 1992: Sedimentary Basins. Springer Verlag

Miall AD, 2000: Principles of Sedimentary Basin Analysis. Springer Verlag

Nichols, G. 1999: Sedimentology and Stratigraphy. Black well

Pettijohn, F J: Sedimentary Rocks. 3rd ed.

Reading, H G, 1996: Sedimentary Environments. Black well

Tucker, M E 1989: Sedimentary Petrology. Blackwell.

Kretz, R. 1994: Metamorphic crystallization, John Wiley

Mc Birney, A.R. 1993: Igneous Petrology, Jones and Bartlet Publ

Miyashiro, A: Metamorphism and Metamorphic Rocks. George Allen Unwin

Phillips, A. 1992: Igneous and Metamorphic Petrology, Prentice Hall.

Turner, F J. and Verhoogen J, 1982: Igneous and Metamorphic Petrology, McGraw

Winkler, HGF: Petrogenesis of Metamorphic Rocks. Springer Verlag

Winter, J D, 2005: Principles of Igneous and Metamorphic Petrology. 2e, PHI Delhi

Yardley, B W. 1989: An Introduction to Metamorphic Petrology, Longman

<https://www.exoticindiaart.com/book/details/geology-in-ancient-vedic-literature-nak921/>

भाग- द: आकलन और मूल्यांकन विधियाँ

अनुशंसित सतत मूल्यांकन विधियाँ:

अधिकतम अंक: 100

सतत व्यापक मूल्यांकन (सीसीई): 40

मध्य सत्र परीक्षा अंक: 60

आंतरिक मूल्यांकन

सतत मूल्यांकन (सीसीई) अंक :

कक्षा परीक्षण/प्रस्तुति/असाइनमेंट/प्रश्नोत्तरी/वाद-विवाद/पोस्टर बनाना/समूह चर्चा आदि।

40

बाह्य मूल्यांकन अंक:

मध्य सत्र परीक्षा अंक:

भाग (अ): अति लघु उत्तरीय प्रश्न

भाग (ब): लघु उत्तरीय प्रश्न

भाग (स): दीर्घ उत्तरीय प्रश्न

60

Practical Paper: Scheme C-1 for ONE Year PG Program				
Part A- Introduction				
Program: PG-1 year		Class: M.Sc. I Semester	Year: 2025	Session: 2025-26
विषय: भूविज्ञान				
1	Course Code	PC32		
2	Course Title	Petrology शैलिकी		
3	Course Type	Core Course कोर कोर्स		
4	Course Level	500		
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरांत		
6	Course Learning Outcome (CLO)	प्रैक्टिकम भाग विद्यार्थियों को प्रतिनिधि नमूनों/मॉडलों/समस्याओं से सीधे परिचित कराकर सैद्धांतिक तर्क को बढ़ाएगा। इससे विद्यार्थियों को समग्र रूप से शैलिकी विषय की समझ को बेहतर बनाने में मदद मिलेगी। चट्टानों के संबंध में प्राचीन भारतीयकी समझ।		
7	Credit Value	4		
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40	
Part B : Content of the Course				
Total No. Of Lectures- Tutorial- Practical (in hours per week): 2 L-T-P: 120				
Topics				No. Of Lectures

1. स्थूल नमूने में आग्नेय चट्टानों का अध्ययन; थिन सेक्शन में आग्नेय चट्टानों का अध्ययन; आग्नेय चट्टानों में संरचना और बनावट; सीआईपीडब्ल्यू मानदंडों और निगली मूल्यों की गणना; मैग्मा और चट्टान प्रकारों के मूल्यांकन के लिए विभिन्न भिन्नता आरेखों पर रासायनिक डेटा की प्लॉटिंग; आग्नेय चट्टान स्लाइड की तैयारी।

2. स्थूल नमूने में अवसादी चट्टानों का अध्ययन; थिन सेक्शन में अवसादी चट्टानों का अध्ययन; छलनी विधि द्वारा प्राथमिक, कण-आकार विश्लेषण का अध्ययन; आवृत्ति और संचयी के रूप में आकार-वितरण डेटा का प्लॉटिंग। वक्र; सांख्यिकीय मापदंडों की गणना और व्याख्या। हाथ के नमूने में माध्यमिक और बायोजेनिक अवसादी संरचनाएं; विभिन्न वातावरणों से पैलियो-वर्तमान डेटा से संबंधित हवाई तस्वीरें और क्षेत्र अभ्यास; निक्षेपण अवसादी वातावरण के विश्लेषण और व्याख्या से संबंधित अभ्यास; कार्बोनेट चट्टानों में स्टेनिंग और खनिज पहचान; पतले वर्गों में डायजेनेटिक विशेषताओं का विस्तृत अध्ययन; अवसादी चट्टानों के थिन सेक्शन की तैयारी।

3. स्थूल नमूने में कायांतरित चट्टानों का अध्ययन; थिन सेक्शन में कायांतरित चट्टानों का अध्ययन; कायांतरित चट्टानों में संरचना और गठन प्रतिक्रिया बनावट की व्याख्या; एसीएफ, एकेएफ और एएफएम आरेखों पर रासायनिक डेटा का प्लॉटिंग; रूपांतरित चट्टान स्लाइड की तैयारी।

3. भारत के विभिन्न महत्वपूर्ण मंदिरों और उनकी चट्टानों पर पोस्टर प्रस्तुति

120

Keywords/ Tags: CIPW norms and Niggli values, thin section, ACF, AKF and AFM diagrams

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings: -

Ram S. Sharma, Editors, 2016: Metamorphic Petrology Concepts and Methods. Geol Soc of India, Bengaluru.
 Rathore, B S, 2021: Igneous Petrology for Beginners. Notion Press
 Sengupta, S 1997: Introductions of Sedimentology. Oxford IBH
 Best, M.G. 1986: Igneous and Metamorphic Petrology, CBS Publ.
 Bose, M.K.1997: Igneous Petrology, World Press
 Bucher, K & Frey, M. 1994: Petrogenesis of Metamorphic Rocks, Springer-V
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 Allen, P. 1997: Earth Surface Processes. Blackwell
 Davis, R A, 1992: Depositional Systems. Prentice hall
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 Turner, F J. and Verhoogen J, 1982: Igneous and Metamorphic Petrology, McGraw
 Winkler, HGF: Petrogenesis of Metamorphic Rocks. Springer Verlag
 Winter, J D, 2005: Principles of Igneous and Metamorphic Petrology. 2e, PHI Delhi
 Yardley, B W. 1989: An Introduction to Metamorphic Petrology, Longman
<https://www.exoticindiaart.com/book/details/geology-in-ancient-vedic-literature-nak921/>

भाग- द: आकलन और मूल्यांकन विधियाँ**अनुशंसित सतत मूल्यांकन विधियाँ:**

अधिकतम अंक: 100

सतत व्यापक मूल्यांकन (सीसीई): 40

मध्य सत्र परीक्षा अंक: 60

आंतरिक मूल्यांकन सतत मूल्यांकन (सीसीई) अंक :	सेमीनार / डेमोस्ट्रेशन/ असाइमेन्ट आदि।	40
बाह्य मूल्यांकन अंक: मध्य सत्र परीक्षा अंक:	टेबल वर्क / प्रयोग, प्रायोगिक रिकॉर्ड,मौखिकी परीक्षा।।	60

Theory Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: PG-1 year	Class: M.Sc. II Semester	Year: 2025	Session: 2025-26
विषय: भूविज्ञान			
1	Course Code	CC41	
2	Course Title	Mineral Exploration, Mining Geology and Mineral Dressing खनिज अन्वेषण, खनन भूविज्ञान एवं मिनरल ड्रेसिंग	
3	Course Type	Core Course कोर कोर्स	
4	Course Level	500	
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरांत	
6	Course Learning Outcome (CLO)	विद्यार्थी खनिज अन्वेषण, खनन भूविज्ञान और खनिज ड्रेसिंग विषय के विभिन्न मूल और उच्चतर घटकों और पहलुओं में अंतर्दृष्टि प्राप्त करेंगे। छात्र व्यावहारिक उपयोग के लिए सैद्धांतिक तर्क और ज्ञान भी विकसित करेंगे। अन्वेषण, खनन और धातु विज्ञान में प्राचीन भारतीय कौशल और उपलब्धियों की समझ।	
7	Credit Value	6	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practical (in hours per week): 6 L-T-P: 90			
Unit	Topics	No. Of Lectures	
I	खनिज अन्वेषण, खनन और खनिज सज्जीकरण (ड्रेसिंग) के ज्ञान में प्राचीन भारतीय उपलब्धियों का परिचय। महरौली लौह स्तंभ-उच्चतम गुणवत्ता का लौह(इस्पात) धातुकर्म। प्राचीन जावर के सीसा जस्ता निक्षेप एवं उनका वृहद स्तरीय खनन। सतह और अधोसतही अन्वेषण के तरीके, आर्थिक खनिजों के लिए पूर्वक्षण - ड्रिलिंग, नमूनाकरण और असेयिंग। प्रकार और विधियाँ। चैनल नमूनाकरण और प्लेसर नमूनाकरण, भूमिगत खदान नमूनाकरण। अयस्क निक्षेप और अयस्क-मार्गदर्शकों का भूवैज्ञानिक नियंत्रण। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	18	

II	भूभौतिकीय तकनीकें - गुरुत्वाकर्षण, विद्युत, चुंबकीय, एयरबोर्न और भूकंपीय। विचलन के लिए बोरहोल लॉगिंग और सर्वेक्षण। भू-आकृति विज्ञान और सुदूर संवेदन तकनीकें। अयस्क भंडार की असेयिंग और गणना। भंडार का वर्गीकरण (यूएनएफसी)। भू-रासायनिक और भू-वनस्पति अन्वेषण विधियाँ। पथ प्रदर्शक तत्व। प्राथमिक फैलाव पैटर्न, सिनजेनेटिक और एपिजेनेटिक प्रसार। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	18
III	खनन शब्दावली, खदान-सपोर्ट, सब्सिडेंस, खदान वेंटिलेशन, खदान के पानी की पंपिंग। खनन विधियों का वर्गीकरण। जलोढ़ खनन और ओपेनकास्ट खनन। महासागर तल खनन का परिचय। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	18
IV	स्टॉपिंग विधियाँ: ओपन स्टॉपिंग, टिम्बर स्टॉप और सिकुड़न स्टॉप। ढुलाई और वाइंडिंग। कोयला खनन: भूमिगत कक्ष और स्तंभ विधि, लंबी दीवार विधियाँ। ओपनकास्ट स्ट्रिप खनन। कोयला खनन में उपयोग किए जाने वाले उपकरणों का परिचय। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी	18
V	खनिज ड्रेसिंग: खनिज ड्रेसिंग का दृष्टि क्षेत्र। क्रशर और पीसने वाली मिलों के प्रकार। कणों का प्रयोगशाला आकार निर्धारण। औद्योगिक स्क्रीनिंग। क्लासिफायर के प्रकार। गुरुत्वाकर्षण पृथक्करण, भारी-मध्यम पृथक्करण, चुंबकीय पृथक्करण, इलेक्ट्रोस्टैटिक पृथक्करण, पृथक्करण की झाग फ्लोटेशन तकनीक, और समामेलन। गाढ़ा करना और पानी निकालना। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी, पोस्टर	18
Keywords/ Tags: ore-guides, Borehole logging , Path finder elements, dewatering		

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Arogyaswamy, R N P, 1996: Courses in Mining Geology. Oxford/ IBH
 Dhana Raju R: Handbook of Mineral Exploration and Ore Petrology: Techniques & Applications Geol soc. India
 Krishnaswamy, S, 1972: India's Mineral Resources. Oxford and IBH
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 Mukherjee, A D, 1999: Elements of Prospecting for Non Fuel Mineral Deposits. Allied Press
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 Deb, S., 1980: Industrial Minerals and Rocks of India. Allied P New Delhi
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 Evans, J M 1993: Ore Geology and Industrial Minerals. Blackwell
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 Richards, R H and Locke, C E 1940, Text Book of Ore Dressing. McGraw Hill
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 Metallurgy in ancient India
<https://www.youtube.com/watch?v=vEwn0vylMdE>
<https://www.scribd.com/document/435308900/Metallurgy-in-Ancient-India-pdf>
<https://www.scribd.com/document/638313125/Metallurgy-in-India>
 Minerals and Mining in ancient India
<https://www.exoticindiaart.com/book/details/minerals-and-mining-in-ancient-india-from-earliest-times-to-beginning-of-christian-era-uax073/>
<https://www.researchgate.net/publication/289193892> Mining in ancient India -
 Glimpses of the glorious past
 Ancient Indian mining technology
<https://www.researchgate.net/publication/388461071> Ancient Indian Mining Technology -
 Rasayana Vidya
<https://www.slideshare.net/slideshow/mining-and-metallurgy-of-ancinet-india/122061814>
<https://geographyandyou.com/geoheritage-sites/zawar-worlds-oldest-zinc-mining-and-metallurgy-site>
 For TIN
https://os.pennds.org/archaeobib_filestore/pdf_articles/bookchapters/2015_Upadhyay.pdf
<https://enrouteindianhistory.com/unearthing-a-precious-metal-gold-mining-in-ancient-india/>

भाग- द: आकलन और मूल्यांकन विधियाँ

अनुशंसित सतत मूल्यांकन विधियाँ:

अधिकतम अंक: 100
 सतत व्यापक मूल्यांकन (सीसीई): 40
 मध्य सत्र परीक्षा अंक: 60

आंतरिक मूल्यांकन

सतत मूल्यांकन (सीसीई) अंक :

कक्षा परीक्षण/प्रस्तुति/असाइनमेंट/प्रश्नोत्तरी/वाद-
 विवाद/पोस्टर बनाना/समूह चर्चा आदि।

40

बाह्य मूल्यांकन अंक: मध्य सत्र परीक्षा अंक:	भाग (अ): अति लघु उत्तरीय प्रश्न भाग (ब): लघु उत्तरीय प्रश्न भाग (स): दीर्घ उत्तरीय प्रश्न	60

Practical Paper: Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: PG-1 year	Class: M.Sc. II Semester	Year: 2025	Session: 2025-26
विषय: भूविज्ञान			
1	Course Code	PC41	
2	Course Title	Mineral Exploration, Mining Geology and Mineral Dressing खनिज अन्वेषण, खनन भूविज्ञान एवं खनिज सज्जीकरण	
3	Course Type	Core Course कोर कोर्स	
4	Course Level	500	
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरांत	
6	Course Learning Outcome (CLO)	प्रेक्टिकम भाग विद्यार्थियों को प्रतिनिधि नमूनों/मॉडलों/समस्याओं से सीधे परिचित कराकर सैद्धांतिक तर्क को बढ़ाएगा। इससे छात्रों को खनिज अन्वेषण, खनन भूविज्ञान और खनिज ड्रेसिंग विषय की समग्र समझ को बेहतर बनाने में मदद मिलेगी। अन्वेषण, खनन और धातु विज्ञान में प्राचीन भारतीय कौशल और उपलब्धियों की समझ।	
7	Credit Value	4	
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practical (in hours per week): 2 L-T-P: 120			
Topics			No. Of Lectures
भूवैज्ञानिक मानचित्रण: भूवैज्ञानिक मानचित्रों की व्याख्या करना और उन्हें बनाना सीखना तथा वलनों और भ्रंशों/जैसी संरचनात्मक विशेषताओं का मानचित्रण करना। भू-रासायनिक विधियाँ: संभावित खनिजकरण की पहचान करने के लिए ट्रेस तत्वों के लिए मिट्टी, पानी और चट्टान के नमूनों का विश्लेषण करना। अयस्क भंडार अनुमान की गणना।			120

भारित-आयतन (वेटेड वॉल्यूम) अनुमान विधियाँ, त्रिभुजाकार विधि द्वारा आयतन अनुमान, बहुभुज विधि द्वारा आयतन, प्रिज्मॉइडल सूत्र द्वारा आयतन।
न्यूनतम स्टॉपिंग चौड़ाई के आधार पर नमूना गणना, कोर ड्रिल नमूनों से औसत परख की गणना, टन भार कारक और इसकी गणना।
अयस्क जमा मूल्यांकन: अयस्क निक्षेप के आकार, ग्रेड और आर्थिक व्यवहार्यता का आकलन करना।
खनिज खनन और धातु विज्ञान में प्राचीन भारतीय ज्ञान और उपलब्धि पर समूह चर्चा
प्रमुख प्राचीन खनन स्थलों की पोस्टर प्रस्तुति।

Keywords/ Tags: Geochemical methods, Mining methods, ore samples

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings:

Arogyaswamy, R N P, 1996: Courses in Mining Geology. Oxford/ IBH
 Dhana Raju R: Handbook of Mineral Exploration and Ore Petrology: Techniques & Applications Geol soc. India
 Krishnaswamy, S, 1972: India's Mineral Resources. Oxford and IBH
 Haldar, S K, 2009: Mineral Exploration: Principles and Applications. Elsevier
 Mukherjee, A D, 1999: Elements of Prospecting for Non Fuel Mineral Deposits. Allied Press
 Umeshwar Prasad 2000: Economic Geology. CBS
 Bateman, 1981: Economic Mineral Deposits. Wiley
 Deb, S., 1980: Industrial Minerals and Rocks of India. Allied P New Delhi
 Dobrin, M B, and Savit C H, 1988: Introduction to Geophysical Prospecting. McGraw
 Evans, J M 1993: Ore Geology and Industrial Minerals. Blackwell
 Hawkes, H and Webb J S, 1979: Geochemistry in Mineral Exploration. Harper NY
 Levinson, A A, 1974: Introduction to exploration geochemistry-T/B. Applied P IL
 Parasnis, D S, 1996: Principles of Applied Geophysics. 5e, Prentice Hall/ Springer
 Richards, R H and Locke, C E 1940, Text Book of Ore Dressing. McGraw Hill
 Richey J E: Elements of Engineering Geology. Sir Issac Pitman & Sons
 Taggart, A F, 1948, Handbook of Mineral Dressing. Wiley New York
 Trefethen N C: Textbook of Geology and Engineering Geology. McMillan.
 Metallurgy in ancient India
<https://www.youtube.com/watch?v=vEwn0vylMdE>
<https://www.scribd.com/document/435308900/Metallurgy-in-Ancient-India-pdf>
<https://www.scribd.com/document/638313125/Metallurgy-in-India>
 Minerals and Mining in ancient India
<https://www.exoticindiaart.com/book/details/minerals-and-mining-in-ancient-india-from-earliest-times-to-beginning-of-christian-era-uax073/>
<https://www.researchgate.net/publication/289193892> Mining in ancient India -
 Glimpses of the glorious past
 Ancient Indian mining technology
<https://www.researchgate.net/publication/388461071> Ancient Indian Mining Technology -
 Rasayana Vidya
<https://www.slideshare.net/slideshow/mining-and-metallurgy-of-ancinet-india/122061814>
<https://geographyandyou.com/geoheritage-sites/zawar-worlds-oldest-zinc-mining-and-metallurgy-site>
 For TIN
https://os.pennds.org/archaeobib_filestore/pdf_articles/bookchapters/2015_Upadhyay.pdf
<https://enrouteindianhistory.com/unearthing-a-precious-metal-gold-mining-in-ancient-india/>

भाग- द: आकलन और मूल्यांकन विधियाँ

अनुशंसित सतत मूल्यांकन विधियाँ:

अधिकतम अंक: 100

सतत व्यापक मूल्यांकन (सीसीई): 40

मध्य सत्र परीक्षा अंक: 60

आंतरिक मूल्यांकन सतत मूल्यांकन (सीसीई) अंक :	सेमीनार / डेमोस्ट्रेशन/ असाइमेन्ट आदि।	40
बाह्य मूल्यांकन अंक: मध्य सत्र परीक्षा अंक:	टेबल वर्क / प्रयोग, प्रायोगिक रिकॉर्ड,मौखिकी परीक्षा।।	60

Theory Paper: Scheme C-1 for ONE Year PG Program					
Part A- Introduction					
Program: PG-1 year		Class: M.Sc. II Semester	Year: 2025	Session: 2025-26	
विषय: भूविज्ञान					
1	Course Code	CC42			
2	Course Title	Environmental Geology and Geochemistry पर्यावरण भूविज्ञान एवं भूरसायन			
3	Course Type	Core Course कोर कोर्स			
4	Course Level	500			
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरांत			
5	Course Learning Outcome (CLO)	विद्यार्थी पर्यावरण भूविज्ञान और भूरसायन विज्ञान विषय के विभिन्न मूल और उच्चतर घटकों और पहलुओं में अंतर्दृष्टि प्राप्त करेंगे। छात्र व्यावहारिक उपयोग के लिए सैद्धांतिक तर्क और ज्ञान भी विकसित करेंगे। प्राचीन भारत में पर्यावरण के समग्र दृष्टिकोण की समझ।			
6	Credit Value	6			
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40		
Part B : Content of the Course					
Total No. Of Lectures- Tutorial- Practical (in hours per week): 6 L-T-P: 90					
Unit	Topics			No. Of Lectures	
I	प्राचीन भारत में पर्यावरण की समझ और अनुप्रयोग तथा समग्र(होलिस्टिक) अवधारणा। सरस्वती-सिंधु घाटी सभ्यता में पर्यावरण नियोजन। पर्यावरण भूविज्ञान की आधुनिक अवधारणा। पर्यावरण का वर्गीकरण। पर्यावरण में सकारात्मक और नकारात्मक प्रतिक्रिया तंत्र। पृथ्वी का ताप बजट। स्टीफन-बोल्ट्ज़मैन समीकरण, ग्लोबल वार्मिंग और जलवायु परिवर्तन के कारण। पृथ्वी की प्राकृतिक आपदाकारी प्रक्रियाएँ और पर्यावरण पर इसका प्रभाव- भूकंपीय, भूस्खलन और तटीय आपदाएँ। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी, पोस्टर			18	

II	औद्योगीकरण और शहरीकरण के कारण सतही जल और भूजल गुणवत्ता के क्षरण और संदूषण का प्रभाव आकलन। मिट्टी की रूपरेखा, मिट्टी के प्रकार; और सिंचाई, उर्वरक और कीटनाशकों के उपयोग के कारण मिट्टी की गुणवत्ता में गिरावट। बैडलैंड्स : - बैडलैंड तंत्र के रूप, विशेषताएँ, चरण, कारण और शमन। भारत की यमुना-चंबल बैडलैंड्स । गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी, पोस्टर	18
III	आर्द्रभूमि: रामसर सम्मेलन संकल्प, वर्गीकरण, प्राकृतिक और कृत्रिम आर्द्रभूमि, आर्द्रभूमि के पुनर्ग्रहण की समस्याएँ, आर्द्रभूमि का उपयोग, भारत की प्रमुख आर्द्रभूमियाँ। जल भराव की समस्याएँ। बाढ़ के कारण; भारत के बाढ़ क्षेत्र। बाढ़ की आपदा और प्रबंधन। बांधों और जलाशयों से संबंधित पर्यावरणीय समस्याएँ। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी, पोस्टर	18
IV	पर्यावरण पर खनन गतिविधियों का प्रभाव। खनन क्षेत्रों में पर्यावरण प्रबंधन। उद्योगों, ऊर्जा संसाधनों और शहरीकरण के कारण पर्यावरण प्रदूषण। मरुस्थलीकरण और भूमि का क्षरण। मरुस्थलीकरण विरोधी उपाय। पर्यावरण प्रदूषण, परमाणु और ताप विद्युत ऊर्जा प्रतिष्ठानों के कारण आपदाएँ। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी, पोस्टर	18
V	तत्वों की ब्रह्मांडीय प्रचुरता। ग्रहों और उल्कापिंडों की संरचना। पृथ्वी की संरचना और संरचना: क्रस्ट, मैनटल और कोर। तत्वों का भू-रासायनिक वर्गीकरण। भू-रासायनिक चक्र। खनिज स्थिरता श्रृंखला। भू-रासायन विज्ञान में ऊष्मागतिकी के सिद्धांत और समीकरण। आग्नेय, अवसादी और रूपांतरित चट्टानों की भू-रासायन विज्ञान। भू-रासायनिक पूर्वक्षण का सिद्धांत। गतिविधियाँ: प्रश्नोत्तरी, संगोष्ठी-पीपीटी, पोस्टर	18

Keywords/ Tags: Earth's Heat Budget, Soil profiles, Badlands, Geochemical Cycle

Part C- Learning Resources

Text Books, Reference Books, Other Resources

Suggested Readings :

Patwardhan A M. 1999: The Dynamic Earth System. Prentice Hall
 Subramaniam V. 2001: Textbook in Environmental Science. Narosa international
 Sumit K 1992: Environmental Hazards. Routledge
 T.E. Graedel & P.J. Crutzen, 1993: Atmospheric Change. W H Freeman and Co
 Bell F G. 1999: Geological Hazards. Rout ledge London
 Carla W. Montgomery, 2011. Environmental Geology. 9e, McGraw Hill
 Hsai-Yang Fang 1997: Introduction to Environmental Geotechnology, CRC Press
 Valdiya K S 1987: Environmental Geology- Indian context. Tata-McGraw
 Gunter Faure, 1991. Principles and Applications of Inorganic Geochemistry: A Comprehensive Textbook. Macmillan Coll Div
 Kula C. Misra. 2012. Introduction to Geochemistry: Principles and Applications. Wiley
 Rathore, B.S.; Basics of Crystallography, Mineralogy and Geochemistry. Notion Press India, 2020.
 William M. White. 2015. Isotope Geochemistry. (Wiley Works) Bell F G. 1999: Geological Hazards. Rout ledge London.
 Smith K. 1992: Geological Hazards. Rout ledge London
 Nipunage, D.S. and Kulkarni, D.K. (2010). Deo-rahati: An Ancient Concept of Biodiversity Conservation. Asian Agri-History. Volume 14(2), 185-196.
 Pandey, Archana (2016). Society and Environment in Ancient India (Study of Hydrology). International Journal of Humanities and Social Science Invention. Volume 5(2), 26-31. ISSN (online) 2319-7722. www.ijhssi.org/ 335 Attitudes towards Environment, Science and Technology
 Satpathy, Binod Bihari (not dated). History of Science and Technology in India. DDCE/History (M.A.)/SLM/Paper.
 Tanwar, Renu (2016). Environment Conservation in Ancient India. IOSR Journal of Humanities and Social Sciences. Volume 21(9), Ver. 11, 01-04.
 Narayanan, Vasudha (2001). Water, Wood and Wisdom: Ecological perspectives from the Hindu Traditions. Daedalus. Volume 130 (4), 179-206.
 Vahia, Mayank (2015). Evaluating the Claims of Ancient Indian Achievements in Science. Current Science. Volume 108(12), 25th June 2015, 2145-48.
<https://egyankosh.ac.in/bitstream/123456789/64796/1/Unit18.pdf>

भाग- द: आकलन और मूल्यांकन विधियाँ**अनुशंसित सतत मूल्यांकन विधियाँ:**

अधिकतम अंक: 100

सतत व्यापक मूल्यांकन (सीसीई): 40

मध्य सत्र परीक्षा अंक: 60

आंतरिक मूल्यांकन

सतत मूल्यांकन (सीसीई) अंक :

कक्षा परीक्षण/प्रस्तुति/असाइनमेंट/प्रश्नोत्तरी/वाद-विवाद/पोस्टर बनाना/समूह चर्चा आदि।

40

बाह्य मूल्यांकन अंक:

मध्य सत्र परीक्षा अंक:

भाग (अ): अति लघु उत्तरीय प्रश्न**भाग (ब):** लघु उत्तरीय प्रश्न**भाग (स):** दीर्घ उत्तरीय प्रश्न

60

Practical Paper: Scheme C-1 for ONE Year PG Program				
Part A- Introduction				
Program: PG-1 year		Class: M.Sc. II Semester	Year: 2025	Session: 2025-26
विषय: भूविज्ञान				
1	Course Code	PC42		
2	Course Title	Environmental Geology and Geochemistry पर्यावरण भूविज्ञान एवं भूरसायन		
3	Course Type	Core Course कोर कोर्स		
4	Course Level	500		
5	Pre-Requisite (if any)	त्रिवर्षीय स्नातक पाठ्यक्रम के उपरान्त		
5	Course Learning Outcome (CLO)	प्राैक्िकम भाग विद्यार्थियों को प्रतिनिधि नमूनों/मॉडलों/समस्याओं से सीधे परिचित कराकर सैद्धांतिक तर्क को बढ़ाएगा। इससे छात्रों को पर्यावरण भूविज्ञान और भूरसायन विज्ञान विषय की समग्र समझ को बेहतर बनाने में मदद मिलेगी। पर्यावरण पर प्राचीन भारतीय विश्वदृष्टि।		
6	Credit Value	4		
8	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40	
Part B : Content of the Course				
Total No. Of Lectures- Tutorial- Practical (in hours per week): 2 L-T-P: 120				
Topics				No. Of Lectures
1. DRASTIC पैरामीटर के साथ भूजल प्रदूषण की संभावना का निर्धारण। 2. सतही जल गुणवत्ता का निर्धारण और जल गुणवत्ता सूचकांक का अनुप्रयोग 3. भारत में भूकंपीय और बाढ़ प्रवण का अध्ययन; सतही जल और उपसतही जल का हाइड्रोकेमिस्ट्री विश्लेषण; पीने, सिंचाई और औद्योगिक उद्देश्यों में उपयोग के लिए भूजल का वर्गीकरण; रासायनिक विश्लेषण की प्रस्तुति; डेटा और प्लॉटिंग; रासायनिक वर्गीकरण आरेख; वायु प्रदूषण और भूजल प्रदूषण के पर्यावरणीय प्रभाव का मूल्यांकन; वनों की कटाई; भूस्खलन। 4. भूरसायनिक मानचित्रों की तैयारी और व्याख्या; चट्टान / अवसाद / पानी / मिट्टी का विश्लेषण। 5. वर्गीकरण और भिन्नता आरेखों की तैयारी, आरईई सामान्यीकृत प्लॉट और उनकी व्याख्या।				120

2. पर्यावरण की समग्र अवधारणा की प्राचीन भारतीय समझ पर समूह चर्चा। 3. (ए) निबंध लेखन पर्यावरण से संबंधित वैदिक चिंता (बी) सामूहिक विनाश (ब्रह्मास्त्र) के हथियारों के उपयोग से संबंधित प्राचीन भारतीय चिंता।		
Keywords/ Tags: DRASTIC parameter, Water Quality Index, drinking, irrigation, industrial		
Part C- Learning Resources		
Text Books, Reference Books, Other Resources		
Suggested Readings : Patwardhan A M. 1999: The Dynamic Earth System. Prentice Hall Subramaniam V. 2001: Textbook in Environmental Science. Narosa international Sumit K 1992: Environmental Hazards. Routledge T.E. Graedel & P.J. Crutzen, 1993: Atmospheric Change. W H Freeman and Co Bell F G. 1999: Geological Hazards. Routledge London Carla W. Montgomery, 2011. Environmental Geology. 9e, McGraw Hill Hsai-Yang Fang 1997: Introduction to Environmental Geotechnology, CRC Press Valdiya K S 1987: Environmental Geology- Indian context. Tata-McGraw Gunter Faure, 1991. Principles and Applications of Inorganic Geochemistry: A Comprehensive Textbook. Macmillan Coll Div Kula C. Misra. 2012. Introduction to Geochemistry: Principles and Applications. Wiley Rathore, B.S.; Basics of Crystallography, Mineralogy and Geochemistry. Notion Press India, 2020. William M. White. 2015. Isotope Geochemistry. (Wiley Works) Bell F G. 1999: Geological Hazards. Routledge London. Smith K. 1992: Geological Hazards. Routledge London Nipunage, D.S. and Kulkarni, D.K. (2010). Deo-rahati: An Ancient Concept of Biodiversity Conservation. Asian Agri-History. Volume 14(2), 185-196. Pandey, Archana (2016). Society and Environment in Ancient India (Study of Hydrology). International Journal of Humanities and Social Science Invention. Volume 5(2), 26-31. ISSN (online) 2319-7722. www.ijhssi.org/ 335 Attitudes towards Environment, Science and Technology Satpathy, Binod Bihari (not dated). History of Science and Technology in India. DDCE/History (M.A.)/SLM/Paper. Tanwar, Renu (2016). Environment Conservation in Ancient India. IOSR Journal of Humanities and Social Sciences. Volume 21(9), Ver. 11, 01-04. Narayanan, Vasudha (2001). Water, Wood and Wisdom: Ecological perspectives from the Hindu Traditions. Daedalus. Volume 130 (4), 179-206. Vahia, Mayank (2015). Evaluating the Claims of Ancient Indian Achievements in Science. Current Science. Volume 108(12), 25th June 2015, 2145-48. https://egyankosh.ac.in/bitstream/123456789/64796/1/Unit18.pdf		
भाग- द: आकलन और मूल्यांकन विधियाँ		
अनुशंसित सतत मूल्यांकन विधियाँ: अधिकतम अंक: 100 सतत व्यापक मूल्यांकन (सीसीई): 40 मध्य सत्र परीक्षा अंक: 60		
आंतरिक मूल्यांकन सतत मूल्यांकन (सीसीई) अंक :	सेमीनार / डेमोस्ट्रेशन/ असाइमेन्ट आदि।	40
बाह्य मूल्यांकन अंक: मध्य सत्र परीक्षा अंक:	टेबल वर्क / प्रयोग, प्रायोगिक रिकॉर्ड, मौखिकी परीक्षा।	60

Theory Paper Scheme C-1 for ONE Year PG Program			
Part A- Introduction			
Program: PG-1 year		Class: M.Sc. II Semester	Year: 2025 Session: 2025-26
विषय: भूविज्ञान			
		VAC (Employability and Entrepreneurship Skill Course)	
1	Course Code	वीएसी (रोज़गार उन्मुख एवं उद्यमिता कौशल)	
2	Course Title	Employability and Entrepreneurship Skill Course रोज़गार परक एवं उद्यमिता कौशल पाठ्यक्रम	
3	Course Type	VAC वी ए सी	
4	Pre-Requisite (if any)	स्नातक उपाधि के उपरांत	
5	Course Learning Outcome (CLO)	विद्यार्थी चुने हुए क्षेत्र में रोजगार और उद्यमिता कौशल पाठ्यक्रम के विषय के विभिन्न मूल और उच्चतर घटकों और पहलुओं में अंतर्दृष्टि प्राप्त करेंगे। छात्र सैद्धांतिक तर्क और ज्ञान के साथ-साथ व्यावहारिक कौशल भी विकसित करेंगे।	
6	Credit Value	2	
7	Total Marks	Max. Marks: 100 (40+60)	Minimum Passing Marks:40
Part B : Content of the Course			
Total No. Of Lectures- Tutorial- Practical (in hours per week): 1 L-T-P: 30			
	Topics		
	(ए)ईईएससी में भूविज्ञान विभाग के छात्रों और संबंधित संकाय की रुचि के ऐसे महत्वपूर्ण विषय शामिल होंगे जो विभाग या स्थानीय उद्योग के पास उपलब्ध सुविधाओं या छात्र और संकाय द्वारा मूल्यांकन किए गए कौशल और रोजगार की मांग के अनुसार होंगे।		
	यदि छात्र (ए) से कोई विषय नहीं चुनता है तो वह कौशल विकास के लिए निम्नलिखित क्षेत्रों में से किसी एक को चुन सकता है। (बी) यहाँ निम्नलिखित विषय सुझाए गए हैं 1. भूवैज्ञानिक सर्वेक्षण और मानचित्रण 2. अयस्कों/खनिज का भू-रासायनिक विश्लेषण 3. खनन संचालन के लिए खनन योजनाओं की तैयारी। 4. भूविज्ञान में संकायों की पसंद के अनुसार प्राचीन भारतीय कौशल		
Keywords/ Tags:			
Part C- Learning Resources			

Text Books, Reference Books, Other Resources		
भाग- द: आकलन और मूल्यांकन विधियाँ		
अनुशंसित सतत मूल्यांकन विधियाँ: अधिकतम अंक: 100 सतत व्यापक मूल्यांकन (सीसीई): 40 मध्य सत्र परीक्षा अंक: 60		
आंतरिक मूल्यांकन सतत मूल्यांकन (सीसीई) अंक :	कक्षा परीक्षण/प्रस्तुति/असाइनमेंट/प्रश्नोत्तरी/वाद-विवाद/पोस्टर बनाना/समूह चर्चा आदि।	40
बाह्य मूल्यांकन अंक: मध्य सत्र परीक्षा अंक:	भाग (अ): अति लघु उत्तरीय प्रश्न भाग (ब): लघु उत्तरीय प्रश्न भाग (स): दीर्घ उत्तरीय प्रश्न	60