Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur (C.G.)

Scheme and Syllabus

Of

M. Sc. (Geology)

Program Code: MSCGL

Semester system for affiliated college

(As per LOCF and credit system)

w.e.f. 2024-2025

(As approved AC and EC meeting held on 16.08.2023 and 18.04.2023 respectively)

अटलबिहारीवाजपेयीविश्वविद्यालय,बिलासपुर(छ.ग.)

कोनीपुलिसथाना के सामने, बिलासपुर–रतनपुरमार्ग, कोनी,जिला–बिलासपुर (छ.ग.) 495009

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Scheme of M.Sc. Geology under Semester System

Program Code:

Semester	N.	Course Code	Subject Name	Credit			Total Credit	Marks			
								ESE	IA	Total	
				L	P	T				Max	Min
Third	1	GLT301	Palaeontology	3	0	1	4	80	20	100	36
	2	GLT302	Ore and Fuel Geology	3	0	1	4	80	20	100	36
	3	GLT303	Geomorphology and Remote sensing	3	0	1	4	80	20	100	36
	4	GLT304	Mineral Exploration	3	0	1	4	80	20	100	36
	5	GLL301	Ore Geology and Mineral Exploration	3	0	1	4	80	20	100	36
	6	GLL302	Paleontology, Geomorphology and Remote sensing	3	0	1	4	80	20	100	36
		Subtotal									
Fourth	1	GLT401	Mining and Engineering Geology	3	0	1	4	80	20	100	36
	2	GLT402	Environmental Geology	3	0	1	4	80	20	100	36
	3	GLT403	Hydrogeology	3	0	1	4	80	20	100	36
	4	GLT404	Disaster Management	3	0	1	4	80	20	100	36
	5	GLL401	Hydrogeology	3	0	1	4	80	20	100	36
	6	GLL402	Engineering Geology and Mining Geology	3	0	1	4	80	20	100	36
		Subtotal									
Total											

Abbreviations used:

ESE: End Semester Exam
IA: Internal Assessment

No change

03/04/24

(MAHFOOZ ARIF)

Part A: Introduction				
Program: M.Sc. Geology		Semester: III	Year: 2nd	w.e.f. : 2024-2025
1.	Course Code	GLT- - 301		
2.	Course Title	PALAEONTOLOGY		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	At the end of the course, the students will be able to 1. Explain fundamental concepts about origin and history of evolution of life and morphology and evolution of Brachiopoda, Echinodermata and Mollusca. Evaluate the principles of Stratigraphy and details of Geological Time scale. 2.Describe morphology and evolution of plant fossils, Trilobites, Graptoloites, man and horse. 3. Explain various kinds of stratigraphy and stratigraphic correlation. Describe Indian stratigraphic systems of Archean, Dharwar, Cuddapah, Kurnool, Vindhyan and AravalliSupergroups. 4. Assess the significance of the Geological Time events of The Paleozoic, Gondwana, Triassic, Jurassic and Cretaceous and the Tertiary Group, Siwaliks, Deccan Trap and boundary problems of various ages.		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture
I.	Definition of fossil and modes of fossilization their application in age determination, paleoclimatology, palaeogeography and evolution. Modes and theories of organic evolution , concept of bathymetric distribution of animals, migration and extinction of species. Outline classification of organisms. Study of morphology, classification, evolutionary trends and geologic and geographical distribution-brachiopod.	12
II.	Study of morphology , Classification, geologic history of the following; Pelecypoda (Lamellibranches) ,GastropodaCepholopoda Trilobites.	12
III.	Study of morphology, Classification, Evolutionary geologic history of the following. Echinoids. Graptolites and Rugosa Corals. An elementary idea about the origin of major groups of vertebrates. Study of evolutionary trends of Horse, Elephant and Man. Study of evolutionary trends of Man.	12
IV.	Generl study of siwalik mammalian fauna. Plant life through geologic ages Study of fossilflora of Gondwana Group and Tertiary Formations of India. Definition and scope of micropaleontology.	12
V.	Techniques in micropaleontology. Application of microfossils in stratigraphic correlation, age determination and Palaeo environmental interpretations. Study of morphology of foraminifers. Classification, evolution and geological distribution of foraminifers	12

Part C - Learning Resources

Text Books , Reference Books, E –Resources

Books Recommended:

Boardman, R.S., Cheethan, A.M. and Rowell, A.J. (1988): Fossil Invertebrates, Blackwell.
Clarksons, E.N.K. (1998): Invertebrate Paleontology and Evolution, Allen and Unwin, London.
Dobzhansky, Ayala, Stebbins and Valentine (1977): Evolution, Freeman.
Horowitz, A.S. and Potter, E.D. (1971): Introductory Petrography of Fossils, Springer Verlag.
Mayr, E. (1971): Population, Species and Evolution, Harvard.

Prothero, D.R. (2004): Bringing Fossil to Life – An Introduction to Paleontology (2nd Ed.), McGraw Hill.
Raup, D.M. and Stanley, S.M. (1985): Principles of Paleontology ,CBS Publ..
Smith, A.B.(1994): Systematics and Fossil Record – Documenting Evolutionary Patterns, Blackwell.
Strean, C.W. and Carroll, R.L. (1989): Paleontology – the record of life, John Wiley.
Bignot, G., Grahm and Trottman (1985): Elements of Micropaleontoogy, London.
Romer, A.S. (1966): Vertebrate Paleontology (3rd Edn.) Chicago University Press.

E -Resources:

1. https://www.mindat.org
2. https://www.mooc-list.com/tags/minerals
3. https://epgp.inflibnet.ac.in/Home
4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up
5. https://egyankosh.ac.in/
6. https://sites.google.com/ignou.ac.in/bscgeology
7. SWAYAM – https://swayam.gov.in/explorer?searchtext
8. National digital library – https://ndl.iitkgp.ac.in
9. e-PG pathshala (MHRD) portal, https://egpg.inflibnet .ac.in

Part A: Introduction				
Program: M.Sc. Geology		Semester: III	Year: Second	w.e.f. : 2024-2025
1.	Course Code	GLT--302		
2.	Course Title	ORE AND FUEL GEOLOGY		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	At the end of the course, the students will be able to 1.Explain fundamental concepts of formation of ore deposits, mode of occurrence of ore bodies and ore textures 2. Describe ores of various affiliations and their occurrence in India 3. Explain about various aspects of coal geology and coal bed methane. 4. Describe origin, mode of occurrence and distribution of petroleum and radioactive minerals in India		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture
I.	Modern concepts of ore genesis. Spatial and temporal distribution of ore deposits- Global perspective. Concept of ore bearing fluids, their origin and migration. Fluid inclusion in ores- limitations and applications Texture, paragensis and zoning in ores. Wall rock alteration. Structural, physical.chemical and stratigraphic controls of ore localization.	12
II.	Orthomagmatic ores of mafic and ultramafic association, Diamonds in kimberlistes, REE in Carbonatite, Ti-V Ores, Chromite and PGE, Ni Ores Cyprus type Cu-Zn Ores. Ores of Silicic igeousroeks-Kiruna type Fe-P. Pegmatoids, Greisen and Skarn deposits. Porphyry associations- Kuroko type Zn-Pb. Pegmatoids. Greisen and Skarn deposits.	12
III.	Ores of Sedimentary affiliations- Chemical and Clastic sediments. Stratiform and Stratabound ore deposits (Fe, [Mn, Non ferrous). Placers and palaeoplacers. Ores of Metamorphic affiliations. Ores related to weathered surfaces- Bauxite. Ni and Au laterite. Mineralogy, genesis, distribution in lndia and uses of Cu,Pb,Zn,	12
IV.	Mineralogy, genesis, distribution in lndia and uses of following ore deposits; lron and manganese (Fe &Mn) Gold and Silver Aluminum and chromium National Mineral Policy and mineral concession rules.	12
V.	Definition and origin of Kerogene and coal. Rank, Grade and type of coal Microscopic constituents of coal. Chemical characterization of coal Proximate and Ultimate analysis. Coal bed methane. Distribution of Coal in lndia. Origin, nature and migration of oil and gas. Characteristics of reservoir rocks. Oil bearing basins of lndia. Geology of productive oil fields of lndia. mode of Occunence and association of atornic minerals in nature. Productive geological horizons, in lndia.	12

Part C - Learning Resources
Text Books , Reference Books, E –Resources

Books Recommended

Chandra, D., Singh, R.M. and Singh, M.P., 2000: Textbook of Coal (Indian Context). Tara Book Agency, Varanasi.

Singh, M.P.(Ed.) 1998: Coal and Organic Petrology. Hindustan Publ. Corp., New Delhi.

Holson and Tiratsoo, E.N.,1985: Introduction to Petroleum Geology. Gulf. Publ. Houston, Texas.

Selley, R.C., 1998: Elements of Petroleum Geology. Academic Press.

Durrance, E.M., 1986: Radioactivity in Geology. Principles and Applications. Ellis Hoorwool.

E -Resources:

1 https://www.mindat.org

2. https://www.mooc-list.com/tags/minerals

3. https://epgp.inflibnet.ac.in/Home

4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up

5. https://egyankosh.ac.in/

6. https://sites.google.com/ignou.ac.in/bscgeology

7. SWAYAM – https://swayam.gov.in/explorer?searchtext

8. National digital library – https://ndl.iitkgp.ac.in

9. e-PG pathshala (MHRD) portal, https://egpg.inflibnet .ac.in

Part A: Introduction				
Program: M.Sc. Geology		Semester: III	Year: Second	w.e.f. : 2024-2025
1.	Course Code	GLT- 303		
2.	Course Title	GEOMORPHOLOGY AND REMOTE SENSTNG		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	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.		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture
I.	Geomorphic concepts and geomorphic cycle. Geomorphic processes - Weathering, soil formation, Mass-Wasting. Valley development, cycle of erosion, rejuvenation. Drainage pattern and their significance.	12
II.	Fluvial landforms and Glacial landforms Karst topography Arid and Eolian landforms , Coastal,and volcanic landforms.	12

III.	Terrain evolution and concept of morphometric analysis. Geomorphic region of India. Principles of terrain analysis. Concept and physical basis of remote sensing.	12
IV.	Electromagnatic spectrum and principle of remote sensing. Interaction of EMR with atmosphere and earth surface features. Remote sensing sensors, data acquisition, visual interpretation and digitalprocessing technique. Interpretation of topographic and tectonic features. Aerial photography, photographs and their geometry. Photogrammetry.	12
V.	Satellite remote sensing. Global and Indian spacemissions. Application of remote sensing in geology. Application in geomorphology. Application in groundwater evaluation terrain evaluation and strategic purposes.	12

Part C - Learning Resources

Text Books , Reference Books, E –Resources

Books Recommended

Thornbury, W.D., 1986: Principles of Geomorphology. John Wiley.

Singh, Savindra, 2007: Geomorphology. PrayagPustakBhavan, Allahabad.

E -Resources:

1. https://www.mindat.org
2. https://www.mooc-list.com/tags/minerals
3. https://epgp.inflibnet.ac.in/Home
4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up
5. https://egyankosh.ac.in/
6. https://sites.google.com/ignou.ac.in/bscgeology
7. SWAYAM – https://swayam.gov.in/explorer?searchtext
8. National digital library – https://ndl.iitkgp.ac.in
9. e-PG pathshala (MHRD) portal, https://egpg.inflibnet .ac.in

Part A: Introduction				
Program: M.Sc. Geology		Semester: III	Year: Second	w.e.f. : 2024-2025
1.	Course Code	GLT-304		
2.	Course Title	MINERAL EXPLORATION		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject of B.Sc. Level		
5.	Course Learning Outcomes (CLO)	At the end of the course, the students will be able to 1. Describe fundamentals of prospecting & exploration and estimate grade and tonnage of ore 2. Discuss geophysical techniques of exploration 3. Explain about borehole logging methods and various surveys done during the course of exploration 4. Describe application of principles of geomorphology, photogeology and remote sensing in mineral exploration and related case studies of various metallic and non-metallic deposits.		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture
I.	Prospecting & Exploration; surface and subsurface methods. Guides of ore search stratigraphic, litho logical; mineralogical and structural guides. Drilling ; types of drilling,Diamond drilling,drilling records and Loggs. Sampling: General principles various method and procedure , Average assays , weighing of samples, Precautions.	12

II.	Calculating grade and tonnage of ore: Aveagegrade , volume , specific gravity ,tonnage factor , calculation from data obtained from bore holes, geological maps and sections.	12
III.	Seismic prospecting: Method of seismic prospecting and interpretation of seismic data. Basic principles of resistivity method. Resistivity survey. Application and interpretation of resistivity data. S.P. method and interpretation of data. Radiometric prospecting, .Radiometric survey. Application and interpretation data.Borehole logging: Principle of various borehole logging method, interpretation of data.	12
IV.	Geochemical cycle, Forms,of primary and secondary dispersion of element, secondary dispersion processes and anomalies. Factors affecting dispersion patterns. Main type of geochemical surveys. Method of litho geochemical and pedogeochemical surveys. Methods of hydro-geochemical, atmogeochemical and biogeochemical surveys.	12
V.	Case study of regional exploration for deposits of plutonic associations, vein and replacement types. Analytical method – samples preparation and decomposition. Precision and accuracy. Instrumentation and application of Atomic absorption spectrometer. Emission spectrograph and XRF. Statistical treatment of geochemical data.	12

Part C - Learning Resources

Text Books , Reference Books, E –Resources

Books Recommended

Bagchi, T.C., Sengupta, D.K., Rao, S.V.L.N. (1979): Elements of Prospecting and Exploration, Kalyani Publ.

Banerjee , P.K. and Ghosh, S. (1997): Elements of Prospecting for Non-fuel Mineral deposits, Allied Publ.

Dobrin, M.B.,1976: Introduction to Geophysical Prospecting. McGraw Hill.

Parasnis, D.S. 1975: Principles of Applied Geophysics. Chapman and Hall.

Sharma, P.V., 1986: Geophysical Methods in Geology. Elsevier.

E -Resources:

1 https://www.mindat.org

2. https://www.mooc-list.com/tags/minerals

3. https://epgp.inflibnet.ac.in/Home

4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up

5. https://egyankosh.ac.in/

6. https://sites.google.com/ignou.ac.in/bscgeology

7. SWAYAM – https://swayam.gov.in/explorer?searchtext

8. National digital library – https://ndl.iitkgp.ac.in

9. e-PG pathshala (MHRD) portal, https://egpg.inflibnet .ac.in

Part A: Introduction				
Program: M.Sc. Geology		Semester: III	Year: 2nd	w.e.f. : 2024-2025
1.	Course Code	GLL -301		
2.	Course Title	Ore Geology and Mineral Exploration		
3.	Course Type	Laboratory Course		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	1.Identify different ores in hand specimen and their associations. 2.Estimate ore reserves and coal reserves from given data. 3.Describe mineralogical and textural characteristics of common ore minerals under ore microscope. 4.Plot various ore deposits in the outline map of India.		
6.	Credit Value	4		
7.	Total Marks	100		

Total Number of Teaching Hours = 60		
	Lab Work	**No.of Hours.**
	1.Megascopic study of metallic and nonmetallic economic minerals. Description and identification, uses and distribution in India. 2. Description and identification of ore minerals in polished section of ores. 3. Study of ore textures and structure under the microscope. 4. Paragenetic study of ore minerals and construction of Paragenetic diagrams. 5. Location of important metallic and non-metallic mineral compels in a map of India. 6. Calculation of ore reserves and assay values. 7. Study and interpretations of Isopach and Isograde maps. 8. Evaluation of simple mining plans. 9. Interpretation of Geophysical and geochemical anomaly	**60**

	maps. 10. Numerical problems based on Geophysical and geochemical data.	

Part A: Introduction				
Program:M.Sc. Geology		Semester : III	Year: 2nd	w.e.f. : 2024-2025
1.	Course Code	GLL -302		
2.	Course Title	Palaeontology , Geomorphology and Remote sensing		
3.	Course Type	Laboratory Course		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	1.Identify various landforms. 2. Distinguish various types of drainage patterns. 3. Do calculations of Morphometric analysis. 4.Identify important fossils from Indian stratigraphic horizons 5. Plotting of stratigraphic horizons in the outline map of India 6.Study of rocks and its sequential arrangement according to geological age		
6.	Credit Value	4		
7.	Total Marks	100		

Total Number of Teaching Hours = 60

	Lab Work	**No.of Hours.**
	A] **PALEONTOLOGY** 1. Study and identification of important invertebrate, vertebrate and plant fossils. Drawing of neat sketches of fossils. 2. Sketching and labeling of representative fossil specimens. 3 Identification and study of important foraminifers. [B] **GEOMORPHOLOGY AND REMOTE SENSING** 1. Identification and interpretation of drainage patterns 2. Drawing of labeled diagrams of landforms 3. Determination of stream order, bifurcation ratio, drainage density, stream frequency, infiltration number. 4. Slope studies of landforms. 5. Study of areal photographs and satellite imageries andidentification of landforms.	**60**

Part A: Introduction				
Program: M.Sc. Geology		Semester: IV	Year: Second	w.e.f. : 2024-2025
1.	Course Code	GLT– 401		
2.	Course Title	MINING AND ENGINEERING GEOLOGY		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	At the end of the course, the students will be able to 1. Understand terms used mining.in 2. Describe the methods of open cast and underground mining 3. Describe general concepts of RP (Reconnaissance Permit), PL (Prospecting License) and ML (Mining Lease) 4. Understand the components of mining plans 5. Explain united nation framework classification (UNFC classification) of mineral resource/reserve. .		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture

I.	Definition of mining terms: pitting, trenching, panning ,adits, tunnels, and shafts. Role of geologist in mining industry. Geological structures of ore deposits and choice of mining methods. Subsidence and rock bursts, mine supports , ventilation and drainage.	12
II.	Open pit mining: geologic and geomorphic conditions, different methods of opencast mining: advantage and limitations. Underground minings: methods gophering, shrinkage, stopping, caving and slicing. Sub level overhand ,under hand method. Coal mining methods long wall board and pillar. Engineering properties of rocks and soil. Physicals characters of building stones.	12
III.	Role of geologist in civil construction projects. Geological consideration for evolution of dam and reservoir sites. Dam foundation problems. Dam failure.Geotechnical evolution of tunnelallignments transportation routes, Methods of tunnelling. Classification of ground for tunnelling. Various types of supports.	12
IV.	General principles, economics justification and scope of mineral dressing. Properties of rocks and minerals applied to minerals dressing. Previous and secondary breaking, crushing and grinding. Liberation by sizes, reduction. Principles and method of screening.	12
V.	Concentration methods; hand sorting, washing, jigging; tabling, heavy fluid. magnetic and electrostatic methods of separation of minerals. Flotation methods. Principles and techniques with examples. concentration methods-with flow sheets of common types of mineral and ore dressing practices in India . Gold, copper, Lead-zinc,coal, beach sand, fluorite, iron, manganese, chromite and limestone.	12

Part C - Learning Resources

Text Books , Reference Books, E –Resources

Books Recommended

McKinstry, H.E., 1962: Mining Geology. II Ed. AsiaPublishing House.

Arogyaswami, R.N.P., 1996: Courses in Mining Geology. IV Ed. Oxford IBH.

Sinha, R.K. and Sharma, N.L. (1976): Mineral economics, Oxford and IBH Publ.

E -Resources:

1. https://www.mindat.org

2. https://www.mooc-list.com/tags/minerals
3. https://epgp.inflibnet.ac.in/Home
4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up
5. https://egyankosh.ac.in/
6. https://sites.google.com/ignou.ac.in/bscgeology
7. SWAYAM – https://swayam.gov.in/explorer?searchtext
8. National digital library – https://ndl.iitkgp.ac.in
9. e-PG pathshala (MHRD) portal, https://egpg.inflibnet .ac.in

Part A: Introduction				
Program: M.Sc. Geology		Semester: IV	Year: Second	w.e.f. : 2024-2025
1.	Course Code	GLT-402		
2.	Course Title	ENVTRONMENTAL GEOLOGY		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	At the end of the course, the students will be able to 1. Explain the fundamentals of Environmental Geology, conservation and climatic changes on different time scales. 2. Analyze the causes of natural disasters and discuss their mitigation measures. 3. Identify the problems of environment in urban and rural areas and assess the impact of human activities on soil, groundwater and other natural resources. 4. Discuss environmental policies of the Government and describe the steps of preparation of EIA report and environment management plan		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture
I.	Definition, history and scope of environmental Geology. Environment, Ecology,Ecosystems and habitat. Nature of its degradation. Basic concepts of Environmental Geology.	12
II.	Interaction of man and natural systems, conservation principle; conservation .of mineral and fuel resources. Conservation .of soil and water resources Geological hazards-.Landslides volcanic activity, Earthquake.	12
III.	Draught and desertification, measure and mitigation. Geological hazards- river flooding, erosion and sedimentation, coastal erosion, cyclone and tsunamis.Transgression and Regression of sea. Measures & mitigation. Human modifications of nature in surface and subsurface by engineering constructions. Dams. Reservoirs, bridges and buildings.	12
IV.	Changes in surface and subsurface by mining activities. changes in surface and subsurface by mineral based industries. Human settlement and contamination of atmosphere, soil, surface water and groundwater by waste disposal and agro-industries..	12
V.	Environmental policies of the Government for air and water pollution. Environmental laws. Problems of environment in urban areas, causes and remedies. climate change and global warming: causes and impact (ozone hole). Environment impact,assessment report and preparation of environment Management plans:	12

Part C - Learning Resources

Text Books , Reference Books, E –Resources

Books Recommended

Valdiya, K.S., 1987: Environmental Geology-Indian Context. Tata McGraw Hill.

Keller, E.A.,1978: Environmental Geology.Bell and Howell,USA.

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

Subramaniyam, V.,2001: Textbook in Environmental Science.Narosa International.

Bell,F.G.,1999: Geological HazardsRoutledge, London.

Smith, K,1992:Environmental Hazards. Routledge, London.

E -Resources:

1. https://www.mindat.org
2. https://www.mooc-list.com/tags/minerals
3. https://epgp.inflibnet.ac.in/Home
4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up
5. https://egyankosh.ac.in/
6. https://sites.google.com/ignou.ac.in/bscgeology
7. SWAYAM – https://swayam.gov.in/explorer?searchtext
8. National digital library – https://ndl.iitkgp.ac.in
9. e-PG pathshala (MHRD) portal, https://egpg.inflibnet .ac.in

Part A: Introduction				
Program: M.Sc. Geology		Semester: IV	Year: Second	w.e.f. : 2024-2025
1.	Course Code	GLT-403		
2.	Course Title	HYDROGEOLOGY		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	At the end of the course, the students will be able to 1. Explain the origin and occurrence, distribution and types of groundwater, Darcy's law and hydrologic properties of rocks 2. Discuss fundamentals of groundwater quality, hydrograph and water table contour map 3. Explain principles of well hydraulics 4. Explain the groundwater exploration methods, water well technology, water management and related techniques.		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture
I.	Scope of hydrogeology and its relation with hydrology, meteorology. Hydrologic cycle. Role of groundwater in the hydrologic cycle. Hydrograph; data collection and analysis. Water table and piezometric-surface. -Water table fluctuation,water table contour maps. Interpretation and uses.	12
II.	Water bearing formation.Aquitard, Aquiclude, Aquifer type: perched, unconfined, semi-confined and confined, Isotropic; anisotropic aquifers. Porosity, permeability, Ground water movement: darcy law and its application specific yield and specific retention. storability and transmissivity. steady and unsteady. Flow, leaky aquifers, Ground-water flow near aquifer boundaries.	12
III.	Bounded aquifers. Image wells. Water wells and their types :Construction wells . Well Development and completion. Pumping test and Yield wells.	12
IV.	Geological and Hydrogeological methods of groundwater exploration. Geophysical methods-Electrical resistivity method for ground water exploration. Application of remote sensing in groundwater exploration. Basin wise development of groundwater with special reference to Chhattisgarh region.	12
V.	Groundwater provinces of India. Sources of dissolved constituents in groundwater. Groundwater quality standard drinking, domestic, agriculture and industry. Ground water pollution. Groundwater management. Safe yield, overdraft and spacing of wells. Conservation of Groundwater, conjunctive use of water, Artificial recharge.	12

Part C - Learning Resources

Text Books , Reference Books, E –Resources

Books Recommended

Todd, D.K.,1980: Groundwater Hydrology. John Wiley.

Davies, S.N. and Cherry, J.A., 1979: Ground Water. Prentice Hall.

Fetter, C.W., 1990: Applied Hydrogeology. Merill Publishing.

Raghunath, H.M., 1982: Ground Water. Wiley Eastern.

Karanth, K.R., 1987: Groundwater Assessment- Development and Management. Tata McGraw Hill.

Subramaniyam, V.,2000:Water. Kingston Publ. London.

E -Resources:

1. https://www.mindat.org
2. https://www.mooc-list.com/tags/minerals
3. https://epgp.inflibnet.ac.in/Home
4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up
5. https://egyankosh.ac.in/
6. https://sites.google.com/ignou.ac.in/bscgeology
7. SWAYAM – https://swayam.gov.in/explorer?searchtext
8. National digital library – https://ndl.iitkgp.ac.in
9. e-PG pathshala (MHRD) portal, https://egpg.inflibnet .ac.in

अटल बिहारी वाजपेयी विश्वविद्यालय, बिलासपुर(छ.ग.)

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Part A: Introduction				
Program: M.Sc. Geology		Semester: IV	Year: Second	w.e.f. : 2024-2025
1.	Course Code	GLT-404		
2.	Course Title	DISASTER MANAGEMENT		
3.	Course Type	Compulsory		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	At the end of this course , the student will be able to: 1. Understand the evolution and architecture of microprocessors, memory systems, and local area networking (LAN). 2. Master the ALU, timing and control unit, registers, data/address c configuration, and instruction set of Intel 8085 microprocessor. 3. Gain proficiency in addressing modes, instruction execution, and data flow in Intel 8085 programming. 4. Acquire knowledge of optical fiber communication, including structure, classification, refraction, and total internal reflection. 5. Explore types of optical fibers, cables, splicing techniques, connectors, and analyze the advantages and disadvantages of optical fiber communication.		
6.	Credit Value	4		
7.	Total Marks	100		

Part B: Contents of the Course		
Total No. of the Lecture		60
Unit	Topic	No. of Lecture
I.	Natural Disasters: Introduction, causes and impact of floods,droughts,cyclone,landslides,earthquake and Tsunamis.	12
II.	Man made Disasters: Introduction Causes and impact of Nuclear, Industrial accidents Environmental disasters, fires, rail accidents, road accidents Air accidents and sea accidents.	12
III.	Hazard Risk Concept and Elements. Risk Analysis and Risk Assessment. Resource Analyses and Mobilisation,Strategic developments for vulnerability reduction.	12
IV.	Disaster Preparedness: Conception and Nature. Disaster Management-Prevention, Preparedness and Mitigation. Search and rescue operations. Use and Applications of Emerging technologies in Disaster preparedness.	12
V.	Disaster management plan.Disaster Response Plan. Communication, Participation and Activation of Emergency Preparedness Plan. Logistics Management.	12

Part C - Learning Resources

Text Books , Reference Books, E –Resources

Books Recommended:

Bell, F.G. (1999): Geological Hazards, Routledge, London.
Bryant, E. (1985): Natural Hazards, Cambridge Univ. Press.
Keller, E.A. (1978): Environmental Geology, Bell and Howell, USA.
Lal, D. S. (2007): Climatology, ShardaPustakBhawan, Allahabad.
Patwardhan, A.M. (1999): The Dynamic Earth System, Prentice Hall.
Smith, K. (1992): Environmental Hazards, Routledge, London.
Subramaniam, V. (2001): Textbook in Environmental Science, Narosa International.
Valdiya, K.S. (1987): Environmental Geology – Indian Context, Tata McGraw Hill.

E -Resources:

1. https://www.mindat.org
2. https://www.mooc-list.com/tags/minerals
3. https://epgp.inflibnet.ac.in/Home
4. https://archive.org/details/in.ernet.dli.2015.233340/page/n15/mode/2up
5. https://egyankosh.ac.in/
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Part A: Introduction				
Program: M.Sc. Geology		Semester: IV	Year: 2nd	w.e.f. : 2024-2025
1.	Course Code	GLL -401		
2.	Course Title	Hydrogeology		
3.	Course Type	Laboratory Course		
4.	Pre- requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	1.Solve problems based on geophysical survey data. 2. Delineate hydrological boundaries on water table contour maps 3. Evaluate aquifer parameters using pumping test data. 4. Analyse Hydrographs. 5. Analyze quality of water using USGS and Piper's diagram.		
6.	Credit Value	4		
7.	Total Marks	100		

Total Number of Teaching Hours = 60		
	Lab Work	**No.of Hours.**
	1. Hydrogeological properties of rocks. 2. Interpretation of water table maps. 3. Computation of pumping test data. 4. Interpretation of Hydrogeochemical data and their plotting in different diagrams. 5. Sieve analysis and screen gravel pack design. 6. Plotting of groundwater provinces on an outline map of India. 7. Computation of Resistivity (VES) data.	**60**

Part A: Introduction				
Program: M.Sc. Geology		Semester: IV	Year: 2nd	w.e.f. : 2024-2025
1.	Course Code	GLL -402		
2.	Course Title	Engineering Geology and Mining Geology		
3.	Course Type	Laboratory Course		
4.	Pre-requisite	Geology subject in B.Sc. Level.		
5.	Course Learning Outcomes (CLO)	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.		
6.	Credit Value	4		
7.	Total Marks	100		

Total Number of Teaching Hours = 60		
	Lab Work	**No.of Hours.**
	1. Interpretation of engineering properties of rocks in hands specimens. 2. Determination of compressive, tensile and sheer strength of rocks. 3. Determination of porosity and absorption of building materials. 4. Mechanical analysis of soils and unconsolidated materials. 5. Preparation of core-logs and their Geotechnical interpretation from bore hole data. 6. Plotting the geographical distribution of important dams, tunnels on the outline of India. 7. Terrain studies from satellite imageries, aerial photographs and toposheet. 8. Concentration methods- with flow sheets of common types of mineral and ore dressing practicess in India - Gold, copper, Lead-zinc, coal, beach sand, fluorite, iron, manganese, chromite and limestone.	60