Govt. Nagarjuna P.G. College of Science
Raipur, C.G.

CURRICULUM & SYLLABI

(Based on CBCS & LOCF)

Bachelor of Science (Geology)
(NEP : Pilot Project)
(V & VI Sem)
Session : 2025-26

Approved by:	Board of Studies	Academic Council
Date:	07-07-2025	

Department of Geology
Govt. Nagarjuna P.G. College of Science
Raipur, C.G.

Scheme of Papers in B.Sc. V / VI Semester Geology 2025-26 as per UGC (NEP Pilot Project)		
Semester	**DSE**	**Total Credits**
B.Sc. V Sem	**Ore Geology and Mineral Exploration**	22
B.Sc. VI Sem	**Structural Geology and Geo-tectonics**	22

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Department of Geology
Syllabus (B.Sc. V Sem)

THEORY

Part A – Introduction

SEM V

Program: DEGREE		Class: B.Sc. V Sem	Year:2025	Session:2025-26
Subject: Geology				
1.	Course Code	SV-GEO-1T		
2.	Course Title	Ore Geology and Mineral Exploration (Paper I)		
3.	Course Type	Discipline Specific Elective (DSE) Theory		
4.	Pre-requisite (if any)	To study this course, a student must have had passed the diploma course with Geology.		
5.	Course Learning Outcomes (CLO)	On completion of course student will be able to- 1. Identify ores, non-metallic and industrial mineral, reserve estimation and deposit characteristics of Fe, Mn, Coal, Petroleum. 2. Understand ore genesis, process of ore formation, 3. Understand the characteristics and distribution of ore deposits, non metallic deposit and industrial mineral. 4. Learn origin of Coal, Petroleum and occurrence of atomic mineral. 5. Understand the mineral exploration, National Mineral Policy, Mineral concession rules		
6.	Credit Value	4		
7.	Marks	Max. Marks- 10 + 40	Min. Marks - 17	

Part B – Content of the Course

Total numbers of Lectures (in hours):60		
Unit	**Topics**	**Number of Lectures**
I	Ore Geology: Ores, gangue and industrial minerals; Tenor, grade and specifications; Resources and reserves; United Nations Framework Classification (UNFC); Reserve estimation; Introduction to ore microscopy; Historical development of ore forming processes/ore deposits, Classification of ore deposits; Temporal and spatial distribution of mineral deposits with special reference to iron, manganese, coal, petroleum and natural gas,base metals and precious metals in India and **Chhattisgarh;** Mineralization associated with plate tectonics; Morphologyof ore bodies.	**12**

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II	Ore Genesis: Early and late magmatic processes; Contact metamorphic and metasomatic processes; Skarn formation; Nature, evolution and chemistry of ore forming fluids; Wall rock alteration; Cavity filling and replacement deposits; Volcanogenic-sedimentary exhalative withreference to sulphide and oxide deposits; Oxidation, Supergene enrichment, Mechanical and residual concentration. Metallic and Non-metallic Mineral Deposits: Physical and chemical properties of Fe, Mn, Cr ores, their geological occurrence and geographical distribution	12
III	Physical and chemical properties of Al, Cu, Pb, Zn and Au ores, their geological occurrence and geographical distribution; Grade,specifications and geographic distribution of minerals used in refractory, fertilizer, abrasive, cement, glass and ceramic, building and precious stones industries	12
IV	Origin, occurrence and distribution of coal and lignite deposits in India, rank and classification of coal, coal bed methane; Origin, occurrence and migration of hydrocarbons and oil traps; Main hydrocarbon basins of India; Mode of occurrence and genesis of atomic minerals, rare metals and rare earths. Mineral resources of **Chhattisgarh** and their Industrial uses with special reference to Iron ore, tin, Al ore, Lime stone, Dolomite and Coal deposits.	12
V	Mineral Exploration and Mineral Economics: Guides, principles and stages of mineral exploration; Drilling; Logging; Plans and sections; Geophysical, Geochemical, Geobotanical and Remote sensing methods , sampling: methods, National mineral policy; Mineral conservation laws; Exclusive economic zones and seabed mining laws. Mineral concession RP, PL, and ML.	12

Part C – Learning Resources

Text Books, Reference Books, Other resources

Suggested Readings:

1. Brown, C. and Dey, A.K.1955. Indian Mineral Wealth. Oxford Univ.
2. Gokhale, K.V.G.K. and Rao, T.C., 1983. Ore Deposits of India. East West Press Pvt. Ltd.
3. Jense, M.L. and Bateman A.M., 1981. Economic Mineral Deposits. John Wiley and Sons.
4. Krishnnaswamy, S., 1979. India's Minerals Resources. Oxford and IBH Publ.
5. Deb, S., 1980. Industrial minerals and Rocks of India. Allied Publishers Pvt. Ltd.
6. Umeshwar Prasad, 2003. Economic Geology. CBS Publishers and distributers.
7. Sharma, N.L. and Ram, K.V.S., 1972. Introduction to India's Economic Minerals, Dhanbad.

Suggested equivalent online courses:

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Part D – Assessment and Evaluation

Suggested Continuous Evaluation Methods: Internal (CCE)+ External Assessment (ESE)				
Assessment	**Mode**	**Max. Marks**	**Min. Marks**	**Pattern**
CCE	Class Test/ Assignment/Presentation	10	04	Unit wise class test
ESE	University Exam	40	13	Objective 10 Ques. compulsory, 5-5 short ans. and long ans. type questions with choice within units.
	Total Marks	50	17	

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PRACTICAL

SEM V

Part A – Introduction

Program: Bachelor in Science (Certificate/Diploma/Degree)	Class: B.Sc. V Sem	Year: 2025	Session:2025-26
Subject: Geology			

1.	Course Code	SV-GEO-1P	
2.	Course Title	Ore Geology and Mineral Exploration (Paper I)	
3.	Course Type	Discipline Specific Elective (DSE) Practical	
4.	Pre-requisite (if any)	This practical course is related to theory paper SV-GEO-IT	
5.	Course Learning Outcomes (CLO)	On completion of this course students will able to identify various ore minerals in megascopic and microscopic observation. They will know the distribution of hydrocarbon, coal and other economic minerals in India.	
6.	Credit Value	2	
7.	Marks	Max. Marks- 10 + 40	Min. Marks - 17

Part B – Content of the Course

Total numbers of Lectures (in hours):30	
	List of experiment
1	Megascopic study of metallic minerals.
2	Megascopic study non-metallic minerals.
3	Megascopic study of industrial minerals.
4	Preparation of map showing distribution of metallic mineral deposits in India and Chhattisgarh
5	Preparation of map showing distribution of non-metallic mineral deposits in India and Chhattisgarh
6	Preparation of map showing distribution of atomic minerals in India.
7	Preparation of maps showing distribution of important coal and lignite deposits in India and Chhattisgarh
8	Preparation of map showing distribution of hydrocarbon basins in India.
9	Microscopic study of common sulphide and arsenide ore minerals
10	Microscopic study of common oxide ore minerals

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Department of Geology
Syllabus (B.Sc. VI Sem)

THEORY **Part A – Introduction** **SEM VI**

Program: DEGREE	Class: B.Sc. VI Sem	Year: 2025	Session: 2025-26
Subject: Geology			

1.	Course Code	S VI-GEO-2T	
2.	Course Title	Structural Geology and Geotectonics (Paper II)	
3.	Course Type	Discipline Specific Elective (DSE) Theory	
4.	Pre-requisite (if any)	To study this course, a student must have had passed the preceding semester with Geology	
5.	Course Learning Outcomes (CLO)	On completion of course student will be able to- 1 Demonstrate the use of clinometer compass in measurement of attitude of bed, explain the deformational structure-- fold, fault, unconformity, joint. 2.Understand basics of field geology, planning for field work, systematic documentation of field data, mountain building processes and plate tectonics 3 know the continental drift, paleomagnetism 4 strengthens the knowledge with respect to understanding the theory of plate tectonics, know the tectonic division of Himalaya. 5 understand the major tectonic features of Peninsular India, neo tectonic activity in India.	
6.	Credit Value	4	
7.	Marks	Max. Marks- 10 + 40	Min. Marks - 17

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Part B – Content of the Course

Total numbers of Lectures (in hours):60

Unit	Topics	Number of Lectures
I	Structural Geology: Contours, topographic and geological maps; Elementary idea of bed, dip and strike; Outcrop; Representation of altitude; Clinometer compass and its use; Classification of structures; Types of deformation; Folds - parts, classification, criteria of theirrecognition in field; Faults - parts, geometrical and genetic classification, criteria of their recognition in field; Joints and Unconformity — types and significance;	12
II	Basics of Field Geology, planning for field work, field equipment, fieldwork and field safety measures; Recognition of Lithology; Measurement of structures; Systematic documentation of field observations. Mountain Building and Plate Tectonics: Classification of mountains; Mountain building and itscauses; Evidences of mountain building processes; Continental drift hypothesis, supercontinent theory of continental drift, evidences of drift theory, mechanism of drifting,	12
III	Fundamentals of Geotectonics: Definition and scope; Earth as a dynamic system; Bulk composition of Earth; Composition of Earth's crust and mantle; Core-Mantle relationship; Structure of continents and oceans; Styles of continental margins, rift valley; Palaeomagnetism definition, rock magnetism; Natural remnant magnetisation; Past and present geomagneticfield; Geographic, magnetic and geomagnetic poles; Apparent polar wander curves; Normaland reverse polarity; Sea Floor Spreading - concept, evidence of sea-floor spreading.	12
IV	Plate Tectonics and Movements: Lithosphere and asthenosphere, types of plates, mechanism behind plate movements, rate of movement; Mantle plume and hotspot; Triple junctions and their present day examples; Types of plate boundaries; Processes at convergent, divergent and transform fault plate boundaries; Break-up of India from Gondwanaland mass; Drift, shallowing and closure of Tethys; Subduction and collision of India with Asia- evolution of Himalaya; Major tectonicdivisions of Himalaya - Indus-Tsangpo suture zone	12
V	Main Central Thrust, Main Boundary Fault, Himalayan Frontal Fault; Major tectonic features of Peninsular India; Introduction to cratons-Central Indian Tectonic Zone- Great Boundary Fault, Moyar-Bhavani Shear Zone, Singhbhum Shear Zone; Neo tectonic evidences in India. Introduction to plate tectonics and ore deposition, plate tectonics and igneous activities, plate tectonics and sedimentation, metamorphism, plate tectonics and ore deposition.	12

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Part C – Learning Resources

Text Books, Reference Books, Other resources
Suggested Readings: 1. Verma, V.K., 1986. Geomorphology Earth surface processes and form. McGraw Hill. 2. Chorley, R. J., 1984. Geomorphology. Methuen. 3. Selby, M.J., 1996. Earths Changing Surface. Oxford University Press UK. 4. Thornbury W. D., 1997. Principles of Geomorphology Wiley Eastern Ltd., New Delhi.
Suggested equivalent online courses:

Part D – Assessment and Evaluation

Suggested Continuous Evaluation Methods: Internal (CCE)+ External Assessment (ESE)				
Assessment	**Mode**	**Max. Marks**	**Min. Marks**	**Pattern**
CCE	Class Test/ Assignment/Presentation	10	04	Unit wise class test
ESE	University Exam	40	13	Objec. 10 Ques are compulsory, 5-5 short ans. and long ans. type questions with choice within units.
	Total Marks	50	17	

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PRACTICAL

SEM VI

Part A – Introduction

Program: DEGREE	Class: B.Sc. VI Sem	Year: 2025	Session:2025-26
Subject: Geology			

1.	Course Code	SVI-GEO-2P	
2.	Course Title	**Structural geology and Geotectonics (Paper II)**	
3.	Course Type	**Discipline Specific Elective (DSE) Practical**	
4.	Pre-requisite (if any)	This practical course is related to theory paper SVI-GEO-2T	
5.	Course Learning Outcomes (CLO)	On completion of this course students are able to understand the geological structures, interpret geological maps and construct cross section, will able to understand dynamics of earth	
6.	Credit Value	2	
7.	Marks	Max. Marks- 10 + 40	Min. Marks - 17

Part B – Content of the Course

Total numbers of Lectures (in hours):30	
	List of experiment
1	Use of clinometer compass
2	Identification of folds from block models.
3	Identification of faults from block models.
4	Identification of unconformities from block models.
5	Laboratory exercises on structural problems of dip and strike.
6	Drawing geological cross section profile and interpretation of geological maps.
7-8	Preparation of physiographic and tectonic map of India.
9	Preparation of plate tectonic model on map with its feature.
10	Field based exercises

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